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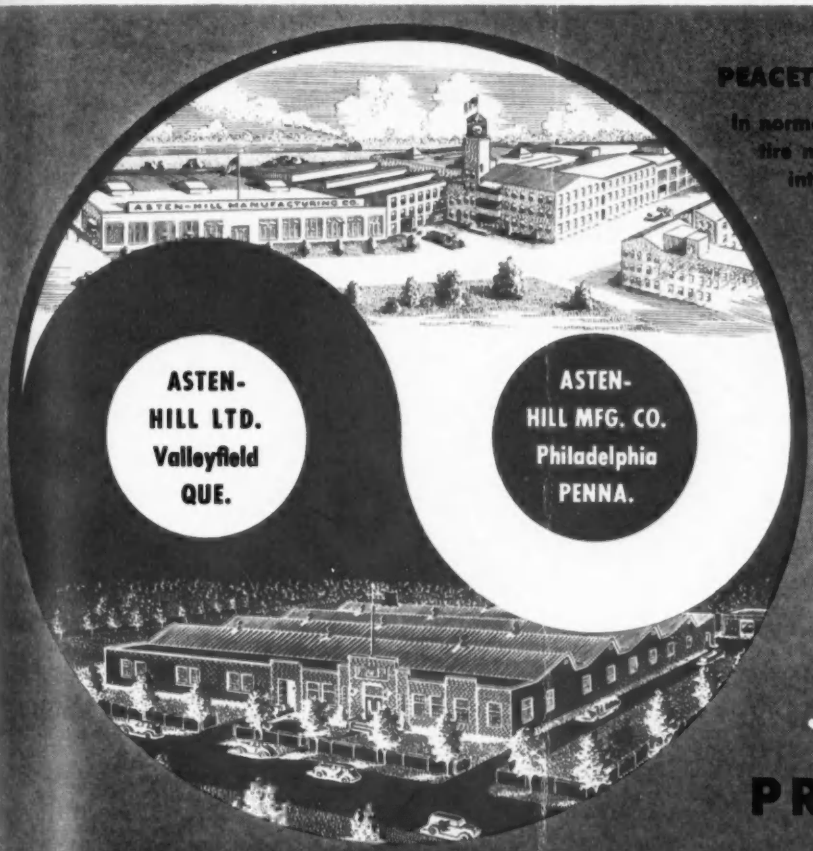
PAPER TRADE JOURNAL

MARCH 9, 1944



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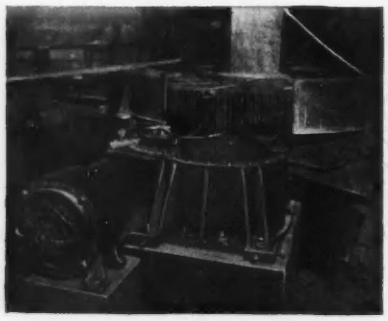
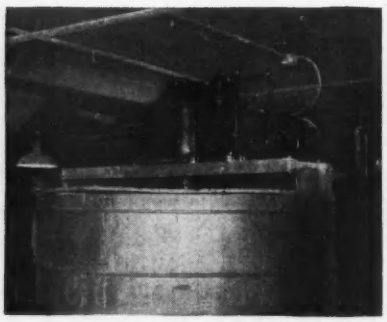


• Jones Worm-Helical Speed Reducer on ore roaster with section of dust guard removed to show final gear reduction.



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TRADE JOURNAL
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Vol. 118, No. 10 Thursday, March 9, 1944 Price Ten Cents

Future Paper Supply Continues Uncertain

Acting Director Harold Boeschenstein of WPB States At Advisory Committee Meeting That Supply Situation Should Not Become More Serious and May Improve — Stresses Need of Waste Paper.

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., March 6, 1944—If new and unpredictable demands for paper and paper board do not increase materially and if possible improvements in pulpwood production are realized, the paper situation should not deteriorate further, and there may be some improvement in the second half of 1944, Harold Boeschenstein, acting director of the War Production Board Forest Products Bureau, told the Newspaper Industry Advisory Committee at its meeting in Washington yesterday.

"However," Mr. Boeschenstein said, "we cannot guarantee now that the military paper and paper board requirements will not be increased during the latter part of 1944, nor can we predict at this time what effects such increased demands might have on the future supply and usage of paper."

Urges Need For More Waste Paper

The industry was urged to extend its efforts in fostering the collections of waste paper. Collections have improved but the supply is still well below needs. The members of the Committee were advised that WPB would continue its efforts to increase the production of wood and pulp in every way.

Strict compliance with all requirements of the Newspaper Limitation Order L-240 throughout the newspaper industry was recommended by the Committee, and Arthur R. Treanor, Government Presiding Officer and director of the Printing and Publishing Division, was urged to see that compliance was enforced. This action was taken following the report that, while there had been a most general and complete adherence to the order by newspapers, a few used newsprint in excess of allowed quotas. Penalties under L-240, it was stated, provide a fine and imprisonment if wilful violation is established. A denial of further deliveries of materials under priority control may also be invoked.

Recommends Reforming of Task Group

The committee also recommended that the division director reorganize the task group, appointed some time ago to study the Philadelphia and similar newspaper situations. Prompt action by the task group and the submission of recommendations to the division on the current Philadelphia problem were urged.

Newsprint orders filed by publishers in the United States in January were reported as aggregating 267,978 tons, against a total consumption of 259,587 tons, the committee was told. The total of 267,978 comprised orders on Canada amounting to 194,624 tons; United States mills 60,354 tons, and Newfoundland, 13,000 tons. Canadian orders for February aggregate 185,000 tons; and March orders reported to date amount to 191,000 tons.

As of today, the figures for production compared with consumption for the first quarter of 1944 appear to indicate a surplus of 32,329 tons, without allowance for paybacks and increased inventories approved but not made. Any available newsprint over and above consumption during the first three months of 1944 will be absorbed by future orders and inventories, the committee was advised. In the future, consumption and inventory figures for each quarter will be required by the division.

Out of 134 newspaper appeals requesting 15,766 tons of paper for the first quarter in 1944, the WPB Appeals Board granted 70 requests, aggregating 4,963 tons. The division's recommendations were for 3,628 tons. The Board denied 55 requests, leaving nine cases undecided, WPB officials stated.

WPB limitation orders affecting the printing and publishing industry are being carefully studied from all angles, the committee was told, but no material changes are contemplated at this time.

The meeting adjourned to assemble on April 20.

War Prisoners Cut Pulpwood

It was estimated by the director of labor projects of the Canadian Department of Labor that by the end of January 2,000 German prisoners of war were cutting pulpwood and logs in the forests of Ontario, according to a report to the Department of Commerce.

Also utilizing this source of woods labor are Quebec with 1,000 prisoners already at work, upper Manitoba with 400, and Alberta with 150.

Sangamon Paper Mill Is Damaged by Fire

Loss Is Estimated At $300,000 By Superintendent T. J. Russell — Equipment Destroyed Includes Two Paper Machines and Much Other Machinery—Judge Rules On Labor Authority—Other News.

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., March 6, 1944—Fire destroyed most of the Sangamon Paper Mill at Kaukauna, Wis., early Tuesday morning, February 28, at a loss estimated by T. J. Russell, mill superintendent, at approximately $300,000. Mr. Russell said there was little hope that the mill will be rebuilt.

The flames left only the four walls of the large stone building standing. Machinery and steel girders were twisted out of shape, but some of the paper machines which were mounted on stone piers still stand—the only indication that the building once had floors.

Mr. Russell declared that three men were operating one of the mill's two paper machines shortly before 4 o'clock Tuesday morning, "when fire began coming up through the floor." The paper machine was located on the first floor. The building, 60 feet wide and 260 feet long, had a basement and first and second floors.

The Kaukauna Fire Department, assisted by Appleton firemen, fought the flames, which reached high into the air, but fortunately the wind carried the smoke and sparks to the southeast, directly away from large piles of pulpwood owned by the Thilmany Pulp and Paper Company. The wind also had much to do with saving the Sangamon firm's warehouse, in which a large quantity of used paper is stored. The firm manufactured bogus kraft and bogus corrugated paper for packing purposes, converting it from waste material.

In addition to the warehouse, the Sangamon property includes a boiler house and office, both undamaged. Mr. Russell included the following among the major losses: Two paper machines, six jordans, four beaters, 12 motors, 75 tons of old paper on the second floor, one paper cutter, one trimmer, two save-alls. About 25,000 pounds of finished rolls on the second floor also were destroyed.

The mill, built about 1885, first was known as the Outagamie Paper Mill and later at the Patten Paper Company. It had been operating only one of its two machines, and employed about 35 persons, seven men having been on duty when the fire was discovered.

It had been purchased in 1941 by Abe and Joseph Cohen of Chicago, after it was idle for several years. Sam J. Cohen, general manager, said that Mr. Russell's estimate of the loss was "about right." Mr. Russell came to Kaukauna from Port Edwards in March, 1941.

Mr. Russell said that he expects the company to release the 35 employes, who are "frozen" in their jobs under War Manpower Commission regulations. It was said that most of the men would be absorbed immediately by the Thilmany Pulp and Paper Company and the Kaukauna Machine Corporation, both of which have lost many men to the armed forces.

Rules on Labor Jurisdiction

The board's order for reinstatement of Gwynne Nettling, a former employe of the Rhinelander Paper Company, Rhinelander, Wis., who alleged he was discharged for failure to join the union, was appealed by the latter. Under the order, the union and the company were to share jointly the costs of Nettling's back wages, and notices were to be posted to the effect that union membership was not a condition of employment. The company complied, but the union filed suit.

All the board's rulings, except that the union share the costs of Nettling's back pay, were upheld by Judge Boileau. The union contended that the Rhinelander Paper Company is engaged in interstate commerce and that the order of th estate board, under authority of the Wisconsin Employment Peace act, conflicted with the National Labor Relations act. The union also claimed that the Wisconsin Employment Peace act was unconstitutional because the union had been deprived of due process of law and its obligations of contract had been impaired.

Judge Boileau ruled that there had been no conflict of jurisdiction between the state and national agencies, and that the Wisconsin Employment Relations Board had authority to issue an order directing all parties to cease and desist from keeping in force an all-union agreement.

Marathon To Honor Workers

Quarter Century Clubs are being organized at various mills of the Marathon Paper Mills Company, as part of the observance of the firm's thirty-fifth anniversary. A meeting was to be held Sunday evening, March 5, at the Elks Club at Wausau, Wis., by the veteran employes at the company's Rothschild, Wausau and Ashland, Wis., mills.

The company will have as its special guests 151 employes, including four women, at a dinner meeting in conjunction with the launching of the organization to honor workers who have been with the company for 25 years or longer.

Ninety-one employes with similar long periods of service at the company's plant at Menasha, Wis., will be honored at the launching of the Quarter Century Club there Monday evening, March 6, to bring the charter membership to 242 persons.

The Quarter Century Club has been under consideration for some time by company officials.

The oldest employe in point of continuous service is D. C. Everest, president and general manager. The company has not had a single labor dispute of any consequence.

NLB Orders Election in Camps

The National Labor Relations Board announced Saturday at Washington, D. C., that it had ordered an election by employes at the Babbitt, Minn., camps of the Tomahawk Kraft Paper Company, Tomahawk, Wis., to determine whether they desire to be represented by the Timber Workers' Union Local No. 29, International Woodworkers of America (CIO) for the purposes of collective bargaining.

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SEVEN-LEAGUE BOOTS have been donned by this nation's dyers and dyestuffs makers since we entered the war. Speed and production are the order of the day.

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U. S. Census of Pulp Mills and of Paper and Paperboard Mills: 1943

The accompanying tables show statistics on production of wood pulp, consumption of wood pulp and other fibrous materials and production of paper and paperboard, for 1943 and 1942 presented in "Facts for Industry" by the Bureau of the Census, Washington 25, D. C., to which inquiries regarding these data should be directed. Also presented is the record of total paper and paperboard production, 1929-1943. The data on paper and paperboard were collected and compiled by the Industry Division of the Bureau of the Census for the War Production Board, and are similar in scope to those published for 1942[1]. The statistics on production of wood pulp and consumption of wood pulp and other fibrous materials were compiled by the Bureau of the Census from data collected by the Pulp Allocation Office of the War Production Board. These data also present a continuation of the data previously published by the Bureau of the Census.

The data on wood pulp production, shown in Table 1, cover all known producers, and are for 204 mills for 1943 and 208 mills for 1942; seven mills suspended operations in 1942 and three started operations in 1943. It should be noted that statistics shown herein differ somewhat from those reported by the United States Pulp Producers' Association. These differences are accounted for by the inclusion here of data for several mills producing considerable quantities of mechanical pulp and semi-chemical, off-quality, screenings and miscellaneous pulp not classified as pulp by the Association, and by differences in individual reports as submitted to the Association and to the Bureau of the Census. The added materials are produced by special processes developed by insulating board mills which require a longer and stronger fiber than is possible from the usual groundwood process. The production of these materials is included here because it is believed that they are basically wood pulp, and because the products made from such pulp have been classified as paper and paperboard.

Data relating to consumption of fibrous materials and production of paper and paperboard in Tables 3, 4 and 5 are for 682 mills in 1943 and 691 mills in 1942: 14 mills suspended operations in 1942 and five started operations in 1943. The count of mills, the consumption of certain waste materials, and the production of insulating board, as shown herein for 1942, differ from corresponding data given in the 1942 publication because of the inclusion in this report of the estimated operations of one mill which was operating in 1942 but did not submit reports until 1943. It was also necessary to make partial estimates of materials consumption for 72 mills which did not submit reports in one or more months of 1943. For materials consumption, the method of estimating and the proportion of estimate for each type of material is given in the footnotes to Table 3. Similar information for paper and paperboard production is given in footnote 1, Table 4.

The consumption data shown in Table 3 represent the total wood pulp and other fibrous materials consumed in the manufacture of paper and paperboard, as shown in Tables 4 and 5. Consumption, however, does not include the amounts used in the manufacture of rayon, explosives, molded pulp products, and other products not produced in paper and paperboard mills. Of the 682 mills producing paper and paperboard in 1943, 456 reported consumption of both wood pulp and other fibrous materials, 98 consumed virgin wood pulp only, 119 consumed only fibrous materials other than wood pulp, and nine reported no consumption during the year.

The data for wall boards as shown here and also as published in earlier years, contain an indeterminate amount of duplication. This is occasioned by the fact that certain producers of laminated board include in their reports the quantity of stock for laminated board which they have purchased from other mills reporting in this survey. This duplication will not occur in future published reports, since the report form has been revised to differentiate between homogeneous wall boards, hard-pressed wall board, and stock for laminated wall boards.

TABLE 1—PRODUCTION OF WOOD PULP, BY PROCESS: 1943 AND 1942[1] (Tons of 2,000 pounds)

Process	1943	1942
All processes	9,544,130[2]	10,710,154
Mechanical, total	1,947,592[2]	2,104,472
Sulphite fiber, total	2,436,502	2,930,272
Unbleached	883,306	1,213,066
Bleached	1,553,196	1,717,206
Sulphate fiber, total	4,235,724	4,730,737
Unbleached	3,486,535	3,948,365
Semi-bleached	147,040	158,862
Bleached	602,149	623,510
Soda fiber, bleached and unbleached	418,868	490,095
Semi-chemical, off-quality, screenings and miscellaneous	505,444	454,578

[1] Source: 1943 and the last nine months of 1942, Pulp Allocation Office, War Production Board; first three months of 1942, Bureau of the Census.

[2] Includes estimated production of one mill. The mill being integrated, the estimate was made on the assumption that the ratio of pulp production to paper and paper production in 1943 was the same as in 1942, when complete reports of pulp production and consumption and paper and paperboard production were received. The proportion of estimate is as follows: All Processes, 1.8 percent; Mechanical Pulp, 9.0 percent.

TABLE 2—PRODUCTION OF WOOD PULP, BY REGION AND BY STATE: 1943 AND 1942[1] (Tons of 2,000 pounds)

Region and State	1943	1942
Aggregate	9,544,130[2]	10,710,154
Northeastern States	2,123,273	2,362,494
Maine	1,103,770	1,181,778
Vermont	15,694	16,932
New York	504,857	582,453
New Jersey	31,701	31,274
Pennsylvania	243,632	263,268
Other Northeastern States	223,619	286,789
Central States	1,422,030	1,523,470
Michigan	195,048	207,163
Wisconsin	835,076	887,918
Minnesota	339,967	356,294
Other Central States	51,939	72,095
Southern States	4,442,614[2]	4,830,195
Virginia	549,343	565,381
North Carolina	365,427	406,644
Florida	603,142	682,973
Alabama	297,118	350,945
Mississippi	355,376[2]	343,346
Louisiana	866,953	987,213
Other Southern States	1,405,255	1,493,693
Pacific States	1,556,213	1,993,995
Washington	1,153,177	1,572,841
Other Pacific States	403,036	421,154

[1] Source: See Table 1, footnote 1.

[2] Includes estimated production of one mill; see Table 1, footnote 2. The proportion of estimate for the aggregate is 1.8 percent: for the Southern States, 3.9 percent; and for Mississippi, 49.3 percent.

Note: To avoid disclosing operations of individual mills, data for the following States are shown in combination only: Northeastern States—New Hampshire, Massachusetts, and Rhode Island; Central States—Ohio and Illinois; Southern States—Maryland, South Carolina, Georgia, Tennessee, Texas, and Arkansas; Pacific States—California and Oregon.

[1] Census of Pulp Mills and of Paper and Paperboard Mills: 1942.

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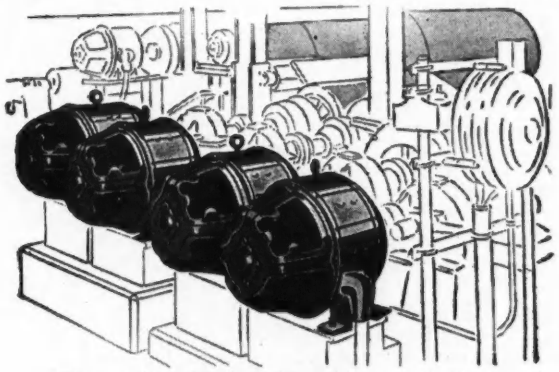
Without clutches, gears or complicated controls, it provides for quick but smooth acceleration—speed variation with very slow speeds for inching—automatic reversing—quick stopping—control of tension—all these readily adaptable to a wide variety of operations in many industries.

The results of Reliance pioneering with many applications of motor-drive are worthy of serious attention in connection with any problem involving machine design or the improvement of production processes. A Reliance engineer will be glad to place the results of this experience at your service any time.



The versatility of Reliance Motor-drive is typified by its application to 4-drum paper winders. Features are: convenient, accurate, safe control. Results are: uniform, snug rolls that please the men who buy and use them.

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TABLE 3—CONSUMPTION OF WOOD PULP AND OTHER FIBROUS MATERIALS IN PRODUCTION OF PAPER AND PAPERBOARD, BY TYPE OF MATERIAL: 1943 AND 1942 [1]

(Tons of 2,000 pounds)

Type of material	1943 [2]	1942
All types	18,096,989	17,728,699 [3]
Wood pulp, total	10,532,776	10,908,789
Mechanical, total	2,147,779	2,273,216
Sulphite fiber, total	2,891,719	3,079,227
Unbleached	1,449,419	1,581,152
Bleached	1,442,300	1,498,075
Sulphate fiber, total	4,458,849	4,562,789
Unbleached	3,612,602	3,781,592
Semi-bleached	163,066	164,384
Bleached	683,181	616,813
Soda fiber, bleached and unbleached	407,172	488,756
Semi-chemical, off-quality, screenings and miscellaneous	627,257	504,801
Fibrous materials other than wood pulp, total	7,564,122	6,819,910 [3]
Waste paper	6,367,854	5,494,959 [3]
Rags	425,910	480,614
Straw	488,266	516,087
Manila fiber and old rope	12,921	28,205
Other fiber	269,171	300,045 [3]

[1] Source: Wood Pulp 1943 and last nine months 1942, Pulp Allocation Office, War Production Board; first three months 1942, Bureau of the Census; Fibrous Materials Other Than Wood Pulp 1943 and last six months 1942, Pulp Allocation Office, War Production Board; first six months 1942, Bureau of the Census.

[2] Includes estimates of materials consumed by 72 mills which did not submit monthly reports for one or more months during 1943. The estimates were made for each mill by computing ratios of materials consumed to paper and paperboard produced for all months for which such information was available, and applying these ratios to reported paper and paperbord production in months for which consumption data were not reported. The proportions of estimates for the several types of materials in 1943 is as follows: All Types, 2.0 percent; Wood Pulp, total, 2.0 percent; Mechanical, 8.2 percent; Semi-Chemical, Off-Quality, Screenings and Miscellaneous, 2.9 percent; Fibrous Materials Other Than Wood Pulp, total, 2.0 percent; Waste Paper, 2.2 percent; and Rags, 1.3 percent. For all other grades of wood pulp and other fibrous materials, the proportion of estimates was less than 0.5 percent.

[3] Revised to include the estimated consumption of materials for one insulating-board mill which was operating in 1942 but did not submit reports until 1943. The estimates were made in the same manner as described in footnote 2 above, using 1943 data for the computation of the ratios. The proportion of estimate for the several types of materials affected is as follows: All Types, 1.4 percent; Fibrous Materials Other Than Wood Pulp, total, 3.6 percent; Waste Paper, 1.5 percent; and Other Fiber, 54.0 percent. As explained in the footnotes to Table 3 in the 1942 report ("Facts for Industry," Series 24-1-1) it was necessary to make estimates of consumption for certain other establishments in 1942.

TABLE 4—PRODUCTION OF PAPER AND PAPERBOARD, BY TYPE: 1943 AND 1942 (Tons of 2,000 pounds)

Type of paper and paperboard	1943	1942
All types	17,035,688	17,083,862 [1]
Paper, total	8,446,852	9,114,678
Newsprint, total	811,309	967,211
Standard rolls	788,781	932,183
Standard sheets	9,386	14,027
Other newsprint	13,142	21,001
Groundwood, printing & specialty papers (50% groundwood or more), total	585.673	610.168
Hanging	66,399	107,302
Catalogue and directory	67,781	80,578
Novel-news and news-tablet	24,482	29,818
Poster and railroad manila	27,986	25,582
Box lining and covering	11,591	13,257
Printing	115,145	95,011
Rotogravure	118,126	123,581
Writing, mimeograph and tablet	54,537	45,639
Bulking book and drawing	30,127	12,192
Continuous form and sales-book	28,752	13,949
Coating and carbonizing	14,724	13,746
Other groundwood papers	26,023	49,513
Book papers (includes printing with less than 50% groundwood), total	1,592,878	1,704,029
General printing, total	981,197	1,083,690
Plain and super—free from groundwood	461,504	650,155
Plain and super—containing groundwood	133,131	46,302
Machine coated—free from groundwood	69,254	103,862
Machine coated—containing groundwood	238,358	218,009
Label, music, poster and wraps	63,984	39,192
Bulking book	14,966	26,170
Converting papers, total	436,594	480,916
Body stock for coated book—free from groundwood	188,862	200,871
Body stock for coated book—containing groundwood	22,635	6,457
Envelope	105,140	103,091
Tablet, adding machine and other business machine papers	101,095	135,303
Other converting papers	18,862	35,194
Lithograph	22,660	26,215
Offset	145,870	106,146
Other book papers	6,557	7,062
Fine papers, total	1,020,601	1,055,475
Writing paper, total	744,333	769,743
Rag, total	116,568	123,242
Bonds and writings	64,295	
Mimeograph	2,174	72,472
Ledgers	15,437	14,784

TABLE 4—*Continued*

Type of paper and paperboard	1943	1942
Manifold	8,756	9,622
Papeterie and wedding	3,344	2,825
Other rag	22,562	23,539
Chemical, total	627,765	646,501
Bonds and writings	395,247	
Ledgers	26,075	450,639
Manifold	30,571	28,599
Mimeograph	86,816	78,024
Papeterie	54,770	44,556
Opaque circular	7,042	5,889
Other chemical	27,244	38,794
Reproduction paper, total [2]	64,309	61,740
Cover paper	37,618	35,554
Text paper	10,117	10,494
Bristols, total	99,126	109,369
Index (rag content)	10,653	
Index (except rag)	53,085	57,875
Printing mill	17,010	21,041
Postcard [3]	12,662	14,433
Other bristols (except bogus)	5,716	16,020
Thin paper, total	54,347	59,095
Carbonizing	20,978	19,480
Condenser	5,468	4,749
Cigarette	24,950	30,564
Other thin paper (stencil, lens, etc.)	2,951	4,302
Drawing paper	5,563	
Other fine papers	5,188	9,480
Wrapping paper, total	2,305,532	2,525,841
Unbleached sulphite and semi-bleached sulphate, total	187,530	246,969
Envelope	17,656	12,204
Butchers' papers—untreated	82,251	
Butchers' papers—treated	14,564	145,828
Bag paper	6,694	17,463
Machine glazed wrapping	11,035	13,109
Grocers' and imitation parchment	16,910	16,782
Waxing stock (18# and up, M.G. and M.F.)	24,828	
Other wrapping paper	13,592	41,583
Bleached sulphite and bleached sulphate, total	355,838	331,613
Waxing stock (18# and up, M.G. and M.F.)	150,252	155,741
Bag paper	36,657	31,062
Machine glazed wrapping	22,263	26,143
Drug wrapping	6,739	
Cup stock	31,598	118,667
Other wrapping paper	108,329	
Unbleached sulphate (kraft), total	1,464,985	1,656,198
Wrapping (M.F.)	269,184	432,377
Wrapping (M.G.)	24,553	36,557
Grocer bag and sack paper (M.F.)	418,968	543,081
Grocer bag and sack paper (M.G.)	13,836	22,633
Heavy duty and multi-wall sack paper	315,469	250,591
Other bag (M.F.)	29,942	35,647
Other bag (M.G.)	12,017	11,248
Converting papers, total	381,016	324,064
Asphalting and creping (other than towel)	159,932	96,381
Envelope	54,620	49,711
Gumming	66,270	57,969
Twisting and spinning (over 18#)	21,983	18,693
Waxing (over 18# M.F.)	15,048	15,103
Waxing (over 18# M.G.)	3,425	4,084
Other converting papers	59,738	82,123
Other kraft, including imitation kraft	24,401	10,039
Manila wrapping (envelope)	23,284	32,507
Greaseproof	27,380	22,799
Glassine and related grades	83.650	81.392
Vegetable parchment	33,294	30,806
Bogus, screenings and core papers	24,449	27,846
Mill wrappers	54,402	59,642
Rope and jute paper (weight 24 x 36 500—less than 100#)	11,557	[4]
Other wrapping paper	14,762	26,030
Special industrial papers (500 sheets, 100 lbs. and up), total	196,105	167,897
Rope and jute paper	9,399	20,149 [5]
Tagboard, light manila board, file folder and pattern (100% chemical pulp)	129,407	129,079
Tagboard, light manila board, file folder and pattern — containing groundwood	28,883	33,265
Other special industrial papers	28,416	5,404
Sanitary papers, total	806,023	811,343
Sanitary napkin stock, wadding stock	39,825	37,610
Toweling stock	190,362	191,373
Toilet tissue stock	414,652	414,655
Napkin stock	76,375	77,607
Facial tissue stock	83,696	89,194
Other sanitary papers	1,113	904
Tissue paper, other than sanitary and thin papers (480 sheets, under 18 lbs.), total	162,766	170,653
Waxing tissue	58,660	46,979
Wrapping tissue	44,848	53,321
Pattern tissue	2,980	3,660
Twisting stock	13,087	9,481
Fruit and vegetable wrapping tissue	30,171	40,846
Crepe wadding for packing	5,393	
Other tissue paper	7,627	16,366
Absorbent paper, total	88,254	64,530
Blotting	9,786	9,496
Filter	3,589	4,196
Matrix paper and board	5,953	6,371
Vulcanized fiber stock	32,167	29,442
Resin impregnating stock	24,445	8,540
Other absorbent paper	12,314	6,485

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PAPERMAKERS CHEMICAL DEPARTMENT

HERCULES POWDER COMPANY

INCORPORATED

WILMINGTON, DELAWARE

Boston, Mass. Holyoke, Mass. Albany, N. Y. New York, N. Y. Atlanta, Ga. Savannah, Ga.
Jacksonville, Fla. Marrero, La. Detroit, Mich. Kalamazoo, Mich. Milwaukee, Wis. Chicago, Ill.
Portland, Ore. San Francisco, Calif. Freeman, Ont. (Hercules Powder Co., Canada, Ltd.)

SUPERIOR PMC CHEMICALS

TABLE 4—*Continued*

Type of paper and paperboard	1943	1942
Building papers, total	877,582	1,001,383
Sheathing paper	35,572	42,783
Felts	722,367	841,995
Asbestos and asbestos-filled	102,966	95,025
Other building papers	16,677	21,580
Paper not elsewhere classified	129	16,148
Boards, total	8,588,836	7,969,184 [1]
Container board, total	4,087,972	3,755,438
Kraft liner (over .009)	1,465,980	1,455,100
Jute liner (over .009)	1,134,353	814,385
Corrugating board (.009)	1,071,156	969,215
Straw	381,363	361,041
Kraft	197,691	341,699
Bogus	294,712	86,969
Semi-chemical	44,074	
Other corrugating	153,316	179,506
Container chip (.009)	48,996	81,201
Container chip (over .009)	289,414	345,743
Other container board	78,073	89,794
Tube stock	307,308	164,785
Folding boxboard	2,015,640	1,711,795
Manila and bleached manila-lined chip board (single & double lined)	598,691	600,751
Patent coated (all type backs	395,813	344,477
Solid sulphate (bleached and unbleached)	137,611	66,196
Solid sulphite (bleached and unbleached)	72,426	32,875
Solid manila board	5,761	[6]
Sulphate and sulphite-lined solid manila	137,875	71,891
Clay coated (bending)	83,935	56,566
Bending chip	246,497	211,078
Kraft lined (single and double)	101,985	60,584
News-lined chip (cracker shell, etc)	125,243	
Other folding boxboard	109,803	267,377 [7]
Set-up boxboard (nonbending and unpasted), total	829,102	996,688
Chip board and strawboard	381,791	508,417
Solid newsboard	169,152	137,273
News-lined chipboard	236,034	274,296
White wood vat lined	32,026	36,171
Other set-up boxboard	10,099	40,531
Cardboard, total	63,757	53,963
Blanks (including clay-coated blanks, etc.)	23,464	28,179
Bogus bristol	11,502	7,002
Photomounts	2,692	
Other cardboard	26,099	18,782
Building boards	1,063,851	1,052,054 [1]
Wall boards	301,333	260,057
Insulating	577,473	608,705 [1]
Liner for gypsum or plaster board	184,475	175,476
Other building	570	7,816
Binders board (wet machine)	53,479	35,248
Pressboard	22,582	23,565
Match board (splint stock)	25,817	25,916
Dense fiber (counter, heels, innersole, leather-board, gasket, etc.)	67,031	50,409
Solid wood pulp	21,155	27,574 [8]
Boards not elsewhere classified	31,142	71,749

[1] Includes estimated production of Insulating Board for one mill. The estimate was made on the assumption that the production of this mill was proportionately the same in 1942 as in 1943. The proportion of estimate is as follows: total Paper and Paperboard production, 1.1 percent; total Boards, 2.4 percent; Building Boards, 18.5 percent; and Insulating Boards, 32.1 percent.

[2] Includes Blueprint and Similar Base Stock; Photographic and Other Sensitizing Stock; and Protective, Addressing, and Check, combined to avoid disclosing operations of individual establishments.

[3] Includes Government Postal Card stock.

[4] Included with Rope and Jute under Special Industrial Papers in 1942.

[5] Includes Rope and Jute, reported separately under Wrapping Paper in 1943.

[6] Included in Solid Wood Pulp Board in 1942.

[7] Includes Suit Boxboard, reported separately in 1942.

[8] Includes Solid Manila Board, reported separately in 1943.

TABLE 5—PRODUCTION OF PAPER AND PAPERBOARD, BY REGION AND BY STATE: 1943 AND 1942

(Tons of 2,000 pounds)

Region and State	1943	1942
Aggregate	17,035,688	17,083,862 [1]
Northeastern States	5,786,554	5,864,335
Maine	1,104,672	1,125,185
New Hampshire	200,060	198,929
Massachusetts	624,282	598,815
Connecticut	240,050	219,678
New York	1,523,945	1,649,451
New Jersey	866,472	835,429
Pennsylvania	1,099,372	1,111,197
Other Northeastern States	127,701	125,651
Central States	5,423,719	5,295,715
Ohio	1,209,677	1,135,599
Indiana	328,074	304,396
Illinois	686,445	699,857
Michigan	1,272,429	1,238,736
Wisconsin	1,238,074	1,239,033
Minnesota	504,111	496,685
Iowa	64,987	61,357
Other Central States	119,922	120,052
Southern States	4,515,587	4,521,848 [1]
Delaware	33,870	38,308
Maryland	197,920	195,294
Virginia	651,148	639,007
West Virginia	22,939	24,028
North Carolina	250,922	242,664
South Carolina	482,220	435,327
Florida	442,815	477,935
Tennessee	178,449	170,949

TABLE 5—*Continued*

Region and State	1943	1942
Alabama	271,217	310,405
Mississippi	350,841	347,893
Louisiana	1,019,132	1,089,899 [1]
Texas	136,550	142,523
Other Southern States	477,564	407,616
Pacific States	1,309,828	1,401,964
Washington	598,704	665,402
Oregon	312,390	335,333
California	398,734	401,229

[1] Includes estimated production of one mill; see Table 4, footnote 1. The proportion of estimate for the aggregate is 1.1 percent; for the Southern States, 4.3 percent; and for Louisiana, 17.9 percent.

Note: To avoid disclosing operations of individual mills, data for the following States are shown in combination only: Northeastern States—Vermont and Rhode Island; Central States—Missouri, Kansas, and Colorado; Southern States—District of Columbia, Georgia, and Arkansas.

TABLE 6—PRODUCTION OF PAPER AND PAPERBOARD, 1929-1943 (Tons of 2,000 pounds)

Period	Old basis	New basis [1]
1929	11,140,235	.....
1930	10,169,140	.....
1931	9,381,840	.....
1932	7,997,872	.....
1933	9,190,017	.....
1934	9,186,598	.....
1935	10,479,095	.....
1936	11,975,552	.....
1937	12,837,003	.....
1938	11,380,814	.....
1939	13,509,642	.....
1940	14,483,709	.....
1941	17,093,092 [2]	.....
1942, total	16,477,663	17,083,862 [2]
1st quarter	4,612,447	4,800,278 [2]
2nd quarter	4,131,311	4,310,663 [2]
3rd quarter	3,737,709	3,863,143 [2]
4th quarter	3,996,196	4,109,778 [2]
1943, total	16,501,597	17,035,688
January	1,332,431	1,375,076
February	1,277,671	1,320,191
March	1,446,922	1,494,857
April	1,392,041	1,438,358
May	1,416,854	1,460,522
June	1,370,708	1,416,114
July	1,348,652	1,393,578
August	1,431,755	1,475,746
September	1,379,351	1,423,853 [4]
October	1,408,974	1,453,475 [4]
November	1,377,101	1,422,433 [4]
December	1,319,137	1,361,485 [4]

[1] Includes data for 25 mills not previously classified as producers of paper and paperboard.

[2] In the 1941 report, the statistics for the year 1941 included data for 10 mills not previously classified as producers of paper and paperboard. In order to provide comparable data for the full period 1929-1943, the production of these 10 mills is here excluded from the 1941 total. "Old basis."

[3] Revised to include estimated production of one mill; see Table 4, footnote 1.

[4] Revised.

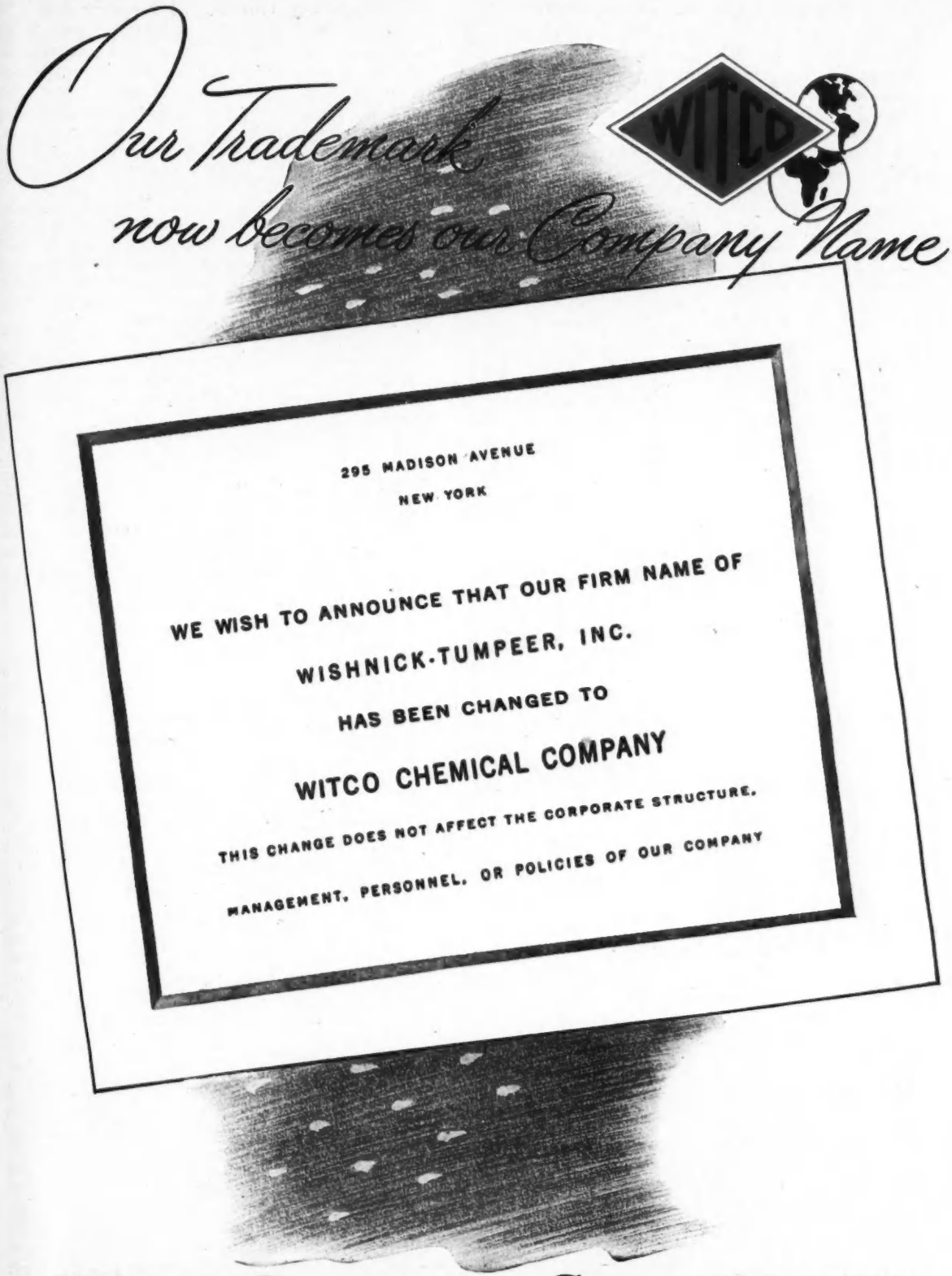
Approves 32 Pound Newsprint Paper

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., March 6, 1944—The controversy over lighter weight newsprint has been settled, with an order by Guy E. Hoult, newsprint administrator, prohibiting the manufacture of newsprint for North American consumption which is lighter than 32 pounds basic weight. The order will apply until April 30 next, in order to give the newsprint administrator time to ascertain the precise nature and full extent of all the problems which appear likely to develop if the production for North American consumption of newsprint of less than 32 pounds basic weight is started.

The Wartime Prices and Trade Board had been informed that certain Canadian newsprint manufacturers had received requests from North American customers for the supply of newsprint of 30-pound basic weight instead of the standard 32-pound basic weight heretofore supplied for North American consumption.

The Advisory Production Committee of the newsprint administrator informed the board that a total or partial conversion of production from newsprint of 32-pounds to newsprint of lower basic weight would result in a decrease of total supply and that the supply by manufacturers of newsprint of different basic weights would result in inequities of distribution.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Buying Paper for Government

WASHINGTON, D. C., March 8, 1944—Henceforth, the Army, like the Navy and the Procurement Division of the Treasury Department, will buy paper on a firm contract, ninety-day basis, the War Production Board announced today. The Army has been using an "open-end" contract, under which the supplier agreed to deliver to the Army when called on to make delivery of tonnages at specified times.

The new Army contract, similar to that of the Navy, will furnish shipping instructions on one-third of the contract each month and considerably reduce the time lag between the issuance of tenders and awards. It will also make possible purchase of more paper on spot market.

The Government Printing Office will hereafter issue paper specifications with contract awards, members of the Over-all Paper Industry Advisory Committee were told at a recent meeting. The Printing Office specifications for the second quarter have been changed, WPB said, to permit a greater use of short-fiber pulp, resulting in a general downward revision.

Army, Navy and Treasury Procurement invitations to bid now incorporate a new clause that will go out with all tenders. The clause has to do with mills quoting on paper grades, the quality of which cannot be the same as formerly because of necessary wartime changes in pulp furnish. This applies to all grades of paper except certain technical papers, such as blueprint, wet-strength map, condenser tissue, and teletype, WPB said.

At the committe meeting, Lt. Col. Martin S. McDonnell discussed the Army's increased needs of paper for the second quarter, emphasizing the necessity for having proper quality of paper and paperboard for packaging Army supplies. The loss of considerable overseas shipments early in the war was reported as due to improper packaging, and more careful packing was urged.

The paper industry should not figure on the maximum amount of paper that it must furnish to the military forces, but rather, on how much it can furnish, the Army spokesman said.

The primary job of the paper industry today is to take care of all Army-Navy requirements of paper as quickly as possible, Rex W. Hovey, Government presiding officer, said.

Waste paper collections were discussed by H. G. Boon, assistant director of the Paper Division, who urged members of the committee to redouble their efforts in that connection.

Michigan Div. to Meet March 16

The next meeting of the Michigan Division of the American Pulp and Paper Mill Superintendents Association will be held on Thursday, March 16, at the Park-American Hotel in Kalamazoo. Dinner will be served at 6:30 P.M.

Herman R. Thies, Goodyear Rubber Company engineer will discuss "Synthetic Rubber as pertaining to Paper Mill Operations."

Lieutenant Edward Dancy, also of the Goodyear Rubber Company, who has recently returned from active combat duty on furlough to recover from injuries will accompany Mr. Thies and will make some remarks concerning the part played by engineers in combat duty.

In addition to this, a film on rubber growth and manufacture will be shown.

Complete Control of Paperboard

WASHINGTON, D. C., March 8, 1944—The critical shortage of container board has made it necessary for the War Production Board to assume complete control over the distribution of all containerboard after April 1, 1944, the War Production Board announced today. To accomplish this, an amendment to Conservation Order M-290 was issued.

Previously, Order M-290 provided for a "reserve" of 25 per cent of each mill's production of containerboard. This "reserve" has been allocated on a monthly basis primarily for the manufacture of V-boxes, which are weatherproof fibre shipping cartons used for overseas military and lend-lease shipments. The remainder of each mill's production was uncontrolled except that it was to be pro-rated among the mill's outstanding contracts or commitments.

The amended order makes it necessary for all users of container board to obtain authorization from WPB as a condition precedent to accepting delivery of this material. These authorizations will be issued on a quarterly basis, disturbing the normal flow of container board as little as possible. At the same time, it will be channeled to most essential uses as represented by rating patterns reported to WPB by converters.

An exemption for small users of 2½ tons per quarter is provided. The order also provides that WPB may direct mills to produce specified types and grades of board and to ship it to specified persons, thus assuring that requirements for such specialized items as V-boxes will be met. To supplement this power, WPB is authorized to direct the manner in which converters must use their container board supplies.

The order bars the use of ratings to get container board, since it was felt that the allocation system, represented by the proposed amendment, provides an adequate substitute for ratings and that their extension to the mills would be disruptive.

To Open Paper Bids March 20

WASHINGTON, D. C., March 8, 1944—The Joint Congressional Committee on Printing will receive bids on March 20 for 37,628,000 pounds of paper for use of the Government Printing Office for the three months period beginning April 1. The committee will meet March 28 to consider awards. The Committee is asking for bids on the following quanitities of paper; 2,200,000 pounds newsprint paper. 150,000 pounds telephone book news. 3,140,000 pounds machine-finish book paper. 80,000 pounds antique book paper. 4,500,000 pounds offset book paper. 40,000 pounds lightweight machine-finish book paper. 50,000 pounds 50% antique book paper. 900,000 pounds supercalendered book paper. 1,900,000 pounds machine-coated book paper. 300,000 pounds coated book paper. 3,000,000 pounds mimeograph paper. 200,000 pounds U S M O safety writing paper. 8,750,000 pounds writing paper. 50,000 pounds map paper. 1,030,000 pounds manifold paper. 3,475,000 pounds bond paper. 980,000 pounds ledger paper. 2,110,000 pounds index paper. 290,000 pounds cover paper. 300,000 pounds manila paper. 80,000 pounds kraft paper. 80,000 pounds blotting paper. 7,500,000 pounds high-finish red sulphite. 60,000 pounds manila tag board. 600,000 pounds calendered tag board. 140,000 pounds jute tag board. 100,000 sheets railroad board. 2,400,000 pounds postal card bristol. 20,000 sheets pressboard. 500,000 pounds news board. 315,000 pounds binder's board.

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Production rates per man and machine-hour rose sharply after the last war. They'll go higher after this war. That's why postwar machines MUST be designed for heavier loads and higher speeds. And that's why the greater load capacity, the longer bearing life, and the lower maintenance costs of Rollway Right-Angle Roller Bearings are vitally important to your postwar designs, right now.

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Right-Angle loading limits the load carried by each bearing to a single, simple load component—*either pure radial or pure thrust*. Thus the unit load per roller is lower, the load capacity for a given dimensional limit is higher. No oblique loads or resultants, no other compound loads can pile up to increase the magnitude of the simple radial or thrust component. Resistance to shock and vibration is increased. Pinch-out of rollers is eliminated—there's less rubbing friction, and less wear-back of roller ends. The net gain is clearly apparent in longer bearing life and lower maintenance cost.

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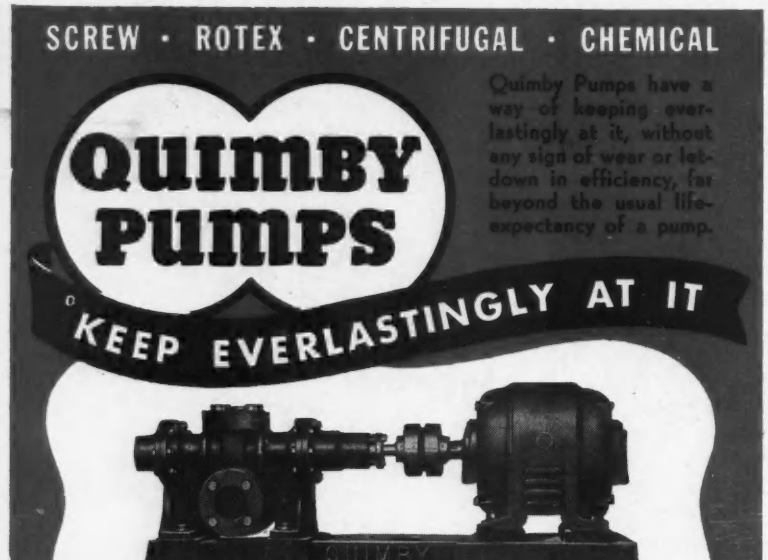
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Enjoin Wastepaper Firms

Continuing with thet all-out drive of the Office of Price Administration to combat black market waste paper dealers, the Syracure District Office obtained the entry of a consent decree of a permanent injunction, together with a full settlement in the amount of $5,000 in the form of a certified check payable to the Treasurer of the United States, in full settlement of the Administrator's action for treble damages against the Empire Waste and Metal Corporation, Utica, N. Y.

Moving swiftly after specific action had been found warranted, a complaint was filed in the Supreme Court of Onondaga County, New York, enumerating the defendant's violations of Maximum Price Regulation No. 30 in charging illegal prices in excess of the ceiling and making false loading charges. The Administrator demanded a permanent injunction restraining the Empire Waste and Metal Corporation from any future violations of MPR 30 as heretofore or hereafter amended, and for judgment on behalf of the United States against the defendant in the amount of $5,000. The final judgment and decree was signed by Justice Frank J. Gregg, Justice of the Supreme Court of the State of New York, granting to the Administrator all the relief requested under the authority of the Emergency Price Control Act.

The Office of Price Administration contemplates the bringing of additional civil and criminal actions against violators in all parts of the country as part of its national enforcement program.

Warren Elects Officers

Pursuant to the elections held at the annual meetings of the stockholders and the directors of S. D. Warren Company, the officers and directors of the company for the ensuing year are as follows:

Roger D. Smith, chairman of the board of directors; George Olmsted, Jr., president; John E. Hyde, vice-president; Edward B. Gray, treasurer; Albert C. Wilde, assistant treasurer; Philip E. Hinkley, secretary; Benjamin S. Van Wyke, clerk of the corporation.

Directors: Edward B. Gray, Philip E. Hinkley, John E. Hyde, George Olmsted, Sr., George Olmsted, Jr., Roger D. Smith, Benjamin S. Van Wyck, and Joseph A. Warren.

Sue Wastepaper Dealers

[FROM OUR REGULAR CORRESPONDENT]

WILMINGTON, Del., March 6, 1944—Suits were filed in the U. S. District Court by the legal division of the Delaware OPA against seven wastepaper dealers and warnings of suspension of federal licenses were issued by the OPA to four other such firms. The OPA charges that the seven firms failed to keep records of purchases and sales, and the court is asked to suspend them from operating unless they maintain records as required by the OPA regulations.

One of the firms is accused of not only failing to keep records but also of violating ceiling prices on the resale of wastepaper to larger firms. There is no evidence in the suits that the public had been defrauded in its waste paper conservation program.

License warning notices were served on four other concerns by the OPA. It was pointed out under OPA regulations failure to comply with the law makes possible the withdrawal of federal licenses issued to all scrap dealers.

Colonel LeFevre said the notices warn the four concerns they have failed to comply with record-keeping provisions of the regulations and further violations may result in action to suspend their licenses for a period of one year.

E. D. Jones & Sons Expand

E. D. Jones & Sons Company of Pittsfield, Mass., recently announced the closing of their gray iron foundry after more than eighty years of continuous operation.

The entire foundry personnel has been absorbed in other departments of the company.

Many changes in design of the company's large list of paper making equipment will call for the use of new materials in place of iron castings formerly used. A considerable volume of castings, however, will still be required and arrangements have already been concluded with long-established nearby foundries who can give prompt service in supplying both gray iron and Meehanite castings.

The present foundry area is being remodelled for an assembly shop which will permit an extensive expansion of the company's output of equipment for the war effort. It will also provide an adequate area for the assembly of paper mill products and place the company in an excellent position to serve its many friends in the paper trade.

FINANCIAL NEWS

New York Stock Exchange

High, Low and Last for Week Ending March 4, 1944

STOCKS

	High	Low	Last
A. P. W.	2½	2⅜	2⅜
Armstrong Cork Co.	37⅜	37	37
Celotex Corp.	11¼	11	11¼
Celotex Corp. pf.	18	17	17¾
Certain-Teed Products Corp.	6⅛	5¾	5⅞
Certain-Teed Products Corp., pf.	64¾	60	63
Champion Paper & Fibre Co.	27	26¼	26¼
Champion Paper & Fibre Co., pf.	111¼	111	111¼
Congoleum Nairn Co.	23⅜	22⅞	22⅞
Container Corp. of America	20⅜	20	20¼
Continental-Diamond Fibre Co.	11⅞	11½	11½
Crown-Zellerbach Co.	16¾	16⅜	16¾
Crown-Zellerbach Co., pf.	99¾	99½	99¾
Dixie Cup Co.	....	....	....
Dixie Cup Co.—A	44⅞	44¾	44⅞
Flintkote Co.	22¾	20⅝	22
Flintkote Co., pf.	105	105	105
Robert Gair	3¾	3⅜	3¾
Robert Gair, pf.	15	14¾	15
International Paper Co.	14⅝	13⅞	14½
International Paper Co., pf.	70	68½	70
Johns-Manville Corp.	89	87⅞	89
Johns-Manville Corp., pf.	....	....	....
Kimberly-Clark Corp.	32½	31½	31½
MacAndrews & Forbes	27¼	26	27¼
MacAndrews & Forbes, pf.	....	....	....
Masonite Corp.	40½	38½	38½
Mead Corp.	10⅝	9⅝	9⅝
Mead Corp., pf. A—6%	88	88	88
Mead Corp., pf. B—5½%	79½	77½	79½
National Container Corp.	13⅝	12¾	12¾
Paraffine Companies, Inc.	46	46	46
Paraffine Companies, Inc., pf.	....	....	....
Rayonier, Inc.	13¾	13	13
Rayonier, Inc., pf.	29	28½	29
Ruberoid Co.	29	28¾	28½
Scott Paper Co.	39⅞	39⅞	39⅞
Scott Paper Co., pf.	110	109	110
Sutherland Paper Co.	31¼	30⅞	31¼
Union Bag & Paper Corp.	10	9⅝	10
United Paperboard Co.	4¾	4¼	4¼
U. S. Gypsum Co.	72½	71	71½
U. S. Gypsum Co., pf.	176	176	176
West Virginia Pulp & Paper Co.	18¾	18¼	18¼
West Virginia Pulp & Paper Co., pf.	106½	105½	106

BONDS

Abitibi Pulp & Paper Co., 5s '53	71⅞	71⅞	71⅞
Celotex Corp. 3¾s '55	....	....	....
Certain-Teed Products Corp. 5½s '48	101½	101⅛	101¼
Champion Paper & Fibre Co. 4¾s '50	....	....	....
International Paper Co. 6s '55	108	107½	107½
International Paper Co. 5s '47	104⅛	104	104
Mead Corp. 3½s '53	....	....	....
West Virginia Pulp & Paper Co. 3s '54	....	....	....

New York Curb Exchange

High, Low and Last for Week Ending March 4, 1944

STOCKS

	High	Low	Last
Great Northern Paper Co.	32	32	32
Hummel-Ross Fibre Corp.	5¼	4⅝	5¼
St. Regis Paper Co.	5⅜	4⅞	5
St. Regis Paper Co., pf.	154½	154	154
Taggart Corp.	5¼	5⅛	5¼

BONDS

American Writing Paper Co. 6s. '61	100	100	100

Hammermill Makes Good Report

The Hammermill Paper Company and Subsidiaries reports as follows for 1943: Net income, subject to renegotiation, and after $1,078,000 taxes, was $585,028 or $2.64 a common share, against $551,388 or $2.45 a common share for 1942, when $1,105,000 was deducted for taxes.

K. V. P. Earns $823,479

The Kalamazoo Vegetable Parchment Company reports as follows for 1943: Net income, $823,479, or $1.65 a share, compared with 1942 net income of $656,096, or $1.31 a share; net sales, $15,319,060, compared with $13,959,769.

Puget Sound Has Net Profit of $456,650

The Puget Sound Pulp and Timber Company, in preliminary figures subject to year-end audit, reports $456,650 net profit for 1943, or $1.19 per common share, after provision of $600,000 for Federal taxes.

This result compares with $702,405 net profit from operations in 1942, equal to $1.94 per common share, after Federal tax provisions of $1,840,000. Proceeds of life insurance amounting to $176,206 raised the 1942 return after taxes to $878,611.

Pulp production of 101,337 tons in 1943 was in comparison with 153,546 tons in 1942. Net sales and other revenue totaled $6,260,773 in 1943, against $8,603,259 in 1942.

Plant operations in the fourth quarter of 1943 continued at about the rate of the four preceding quarters, around 60 per cent of capacity, whereas the operating rate was 100 per cent of capacity during the first nine months of 1942.

Net profit after Federal tax provisions amounted to $102,399 in the fourth quarter of 1943, in comparison with $117,652 in the third quarter, and with $78,313 in the fourth quarter of 1942; in the latter figure the non-recurring life insurance item is excluded.

Net sales of $1,730,410 for the fourth quarter of 1943 were comparable to $1,657,351 in the third quarter, and with $1,604,017 in the fourth quarter of 1942.

Scott Reports $1,534,926 Net

The Scott Paper Company and its subsidiaries had a net profit last year of $1,534,926 after all charges, including provision for Federal and state taxes on income and capital stock amounting to $1,258,500, according to the annual report issued yesterday. Net sales amounted to $30,569,546.

The income is equal, after preferred dividend requirements, to $1.91 a common share and compares with $1,750,793 or $2.24 a share on common stock earned in 1942, when $2,143,385 was provided for taxes.

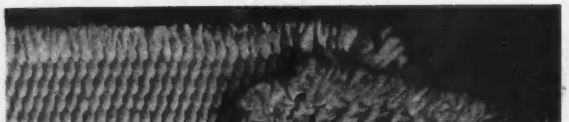
Thomas B. McCabe, president, in his remarks to stockholders, said that by the end of 1943 the company's manufacturing costs were 20 per cent above 1941, while prices had been frozen at or below the 1941 level and that this unavoidably had an adverse effect on earnings.

Robert Gair Declares Dividend

At a meeting of the board of directors of Robert Gair Company, Inc., held on February 28, 1944, a quarterly dividend of thirty cents per share in respect of the first quarter of the year 1944 was declared on the preferred stock of the par value of $20 per share of the company, payable April 1, 1944 to stockholders of record at the close of business on March 13, 1944, without the closing of the transfer books.

At the same meeting, the board of directors declar-

BRANDON
DRYER
FELTS



Manufactured from the raw cotton to the finished felt

BRANDON EXTRA

TRI-UMPH all cotton, 3 ply 53 oz., widths up to 250".

ZEPHYR all cotton, 3 ply 45 oz., widths up to 196".

ZEPHYR cotton-asbestos 3 ply Face 50% asbestos, back open construction for high porosity. Widths up to 166".

HINDLE S/54 all cotton special weave. Extra heavy duty Preshrunk, high porosity, widths up to 170".

SCAPA-HALL S/46 and S/46A. Available after VICTORY.

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Baltimore, 1, Md.

Representatives:

J. S. Harrington, Watertown, N. Y.
C. B. Smith, Kalamazoo, Mich.
Christian Co., Richmond, Va.
D. H. White, Standard Supply Co., New Orleans
Frank P. Wilder, Portland, Ore.
James A. Taylor & Son, Portland, Maine

ed the full six per cent interest on Robert Gair Company, Inc. Income Notes 1972's, payable April 1, 1944 to the holders of record at the close of business March 31, 1944.

Container Corp. of America nets $2,884,054

Container Corporation of America and subsidiary companies report consolidated net profit for 1943 of $2,884,054, equal to $3.69 per share of capital stock. This compared with $2,401,748, or $3.07 per share, for the year 1942. The 1943 net profit was figured before an appropriation for $700,000 was made for war and post-war reserve.

$730,619 Reported by Ruberoid

The Ruberoid Company reports for 1943: Net profit, after taxes and $240,000 for reserve for wartime contingencies, was $730,619. With the post-war refund of excess profits tax included, the net profit amounted to $812,519, or $2.04 a share, compared with $988,288, or $2.48 a share, in 1942. Net sales totaled $27,338,360, compared with $29,456,576.

American Writing Nets $244,966

The American Writing Paper Corporation reports as follows for 1943: Net income, after $530,824 provision for Federal taxes on income and $83,936 provision for income tax contingencies, was $244,966, compared with $233,936 in 1942, after $335,671 taxes and $99,283 provision for income tax contingencies.

West Virginia Reports for Quarter

The West Virginia Pulp and Paper Company and Subsidiaries reports as follows for the quarter to January 31: Net profit, $623,832, after Federal taxes of $1,193,000, compared with $764,718, after taxes of $1,340,000, in quarter to January 31, 1943.

Bathurst Profits Lower

MONTREAL, Que., March 6, 1944—The financial statement of the Bathurst Power and Paper Company for 1943 shows a net profit of $539,371, as compared with $750,114 in the previous year.

Warn of Optimism on Newsprint Supply

The American Newspaper Publishers Association warns that remarks concerning the paper industry and the availability of newsprint during the next year made in Washington on Tuesday of last week by Harold Boeschenstein, acting director of the War Production Board Forest Products Bureau, should not be interpreted as a forecast of greater supplies of newsprint for the next six months.

"If new and unpredictable demands for paper and paperboard do not increase materially and if possible improvements in pulpwood production are realized," Mr. Boeschenstein had announced, "the paper situation should not deteriorate further, and there may be some improvement in the second half of 1944."

The Publishers Association made this comment:

"Mr. Boeschenstein said that no one could reliably predict this. Any improvement and even maintenance of present rates is dependent not only on supply from Canada as well as our own efforts to increase the cutting of wood, but also depends upon unpredictable needs which may grow out of the European invasion and other military operations."

Franklin A. Stone Dead

MONTCLAIR, N. J., March 5, 1944—Franklin A. Stone, for many years a partner in the New York City wholesale paper house of Bulkley, Dunton & Co., died this morning at Mountainside Hospital after a two weeks' illness. Mr. Stone was seventy years old and lived at 23 Clarendon Place, Bloomfield, N. J.

Mr. Stone was superintendent of Sunday school at the Brookdale Baptist Church and a director of the Bloomfield Bank and Trust Company. He also was a member of the executive board of the African General Mission and a trustee of the Evangelistic Committee of Newark.

Surviving are his wife, Mrs. Ida Garbrant Stone; two daughters, Miss Mildred S. Stone and Mrs. David H. Dugan Jr.; twin sons, Corporal Davis G. Stone, A. U. S., stationed at Pasadena, Calif., and Ensign Franklin A. Stone Jr., U. S. N., stationed at Cambridge, Mass., and a brother, Herbert L. Stone.

I. P. Announces Changes in Boston

It will come as no surprise to his many friends to learn that C. E. Rice has been appointed New England sales agent for both International Paper Sales Company, Inc. and International Paper Company. At the same time, H. C. Fowler's appointment as assistant New England sales agent for the International Paper Company was announced. These changes became effective February 29.

Mr. Rice has long been associated with the late John E. A. Hussey in the management of the Boston office of the company. His many years of experience with International amply qualify him for his new duties and greater responsibilities. Mr. Rice is one of the active members of the Quarter Century Society of the company.

H. C. Fowler likewise has had years of experience in the New England market, devoting his time primarily to the converting and merchant trade.

Analyzes T. & H. Calendar

BOSTON, Mass., March 6, 1944—The Tileston & Hollingsworth 1944 Calendar has been analyzed by Philip J. McAteer, craftsman, in Providence, Worcester, Boston and Springfield before a total of nearly 500 craftsmen. Mr. McAteer has appeared at the Craftsmen's Club of Columbus, Ohio, and is appearing before the Washington Craftsmen's Club some time this month. Mr. McAteer's approach to the analysis of the Calendar Sheets contained several innovations which were of great interest to the craftsmen and created considerable discussion.

WANTED

A man competent to act as Vice President and take full charge of mills manufacturing heavy paper products. This position will pay very attractive salary for a man who has the qualifications and experience to fill this important post. Address in strictest confidence or telephone

CHARLES P. RAYMOND SERVICE, Inc.

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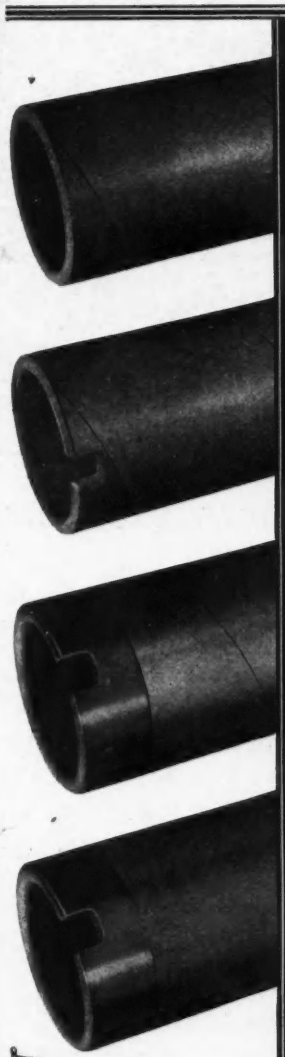
PAPER MILL

cores



RHINO NON-RETURNABLE

For all uses requiring an extremely tough non-returnable paper mill core.

DURO—Standard returnable core of plus-standard quality. Shown with Taylor ends. Also available with Bermico ends.

ENDURO—Very high grade returnable core to meet extra demand for strength. Shown with Bermico ends. Taylor ends available.

BERMICO—Returnable fibre core—extremely hard, strong and rugged. Treated to resist weather and moisture changes.

BERMICO*

*Exclusive distributors for Bermico Ends and Bermico Fibre Cores.

ARMY E NAVY

SONOCO MAKES *EVERYTHING* IN *PAPER CARRIERS*

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BRANTFORD ONT · HARTSVILLE S. C. · MYSTIC CONN.

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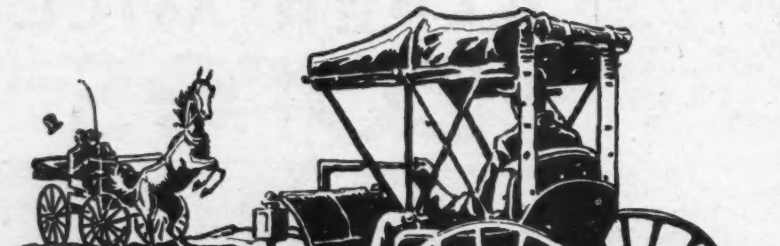

American Pioneers

Charles E. Duryea built and operated one of the first gasoline driven vehicles. He claimed to have sold the first such vehicle in America in 1898. The Automobile depicted is now in the National Museum.

Before the first Automobile fueled by gasolene was made in 1893, Draper Brothers had been in business thirty-seven years. The pioneer Duryea Car has become a museum piece and its name has disappeared from the automotive world.

Life is determined by the survival of the fittest. **DRAPER FELTS** continue to survive because they satisfy modern requirements.

Draper Felts Favor Efficiency

DRAPER BROTHERS COMPANY

Woolen Manufacturers Since 1856

CANTON, MASS.

OUR REPRESENTATIVES *to serve you*

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RALPH E. BRIGGS, Canton, Mass.

W. L. CAMPBELL, Savannah, Ga.

E. R. LELOFF, Vancouver, Wash.

CHAS. E. BERTSCHY, Milwaukee, Wis.

I. H. Copeland Dead

Irwin Henning Copeland, manager of manufacturing operations of Canadian International Paper Company, died on February 28 at North Miami Beach, Florida. He was recuperating from a recent illness and was contemplating an early return to his usual business activities when a sudden heart attack caused his death. The funeral was held in Glens Falls, N. Y.

Mr. Copeland was also vice-president of New Brunswick International Paper Company. His home was at 220 Chester Road, Town of Mount Royal, Montreal. He leaves his wife, Elizabeth Norton Copeland, and a son, Sergeant William H. Copeland, RCAF, who is serving overseas with the RAF.

Mr. Copeland was born in 1892 at Argyle, N. Y. He was educated at Glens Falls Academy and Mercersburg Academy and spent his whole life in the paper industry. Starting with Finch Pruyn & Company at Glens Falls, N. Y., he later moved to Canada, successively occupying posts of increasing responsibility with several companies until 1929 when he joined Canadian International Paper Company as assistant manager of its mill at Three Rivers, P. Q. He was active in technical associations of the paper industry and was generally recognized as a progressive operator and sound in judgment. He was respected and well liked by his staff, associates, and a wide circle of friends both within and outside the industry. He was an ardent and skillful fisherman and was a member of the St. James's and Kanawaki Golf Clubs and of several fishing clubs.

J. S. Coey Joins Hooker

The Hooker Electrochemical Company announces the appointment of John S. Coey to its Sales Development Department with headquarters at Niagara Falls, N. Y. Mr. Coey is a graduate in chemistry from Amherst College. For the past seven years he has been in the manufacturing department of the company at its Niagara Falls, New York, plant, where he was in charge of the Process Study Group engaged in the improvement of processes, operating efficiencies, and quality of products. He brings to his new assignment an intimate knowledge of many of Hooker's regular chemicals and experience in their handling and characteristics which will effectively augment technical service available to the trade from this company.

Revise Essential Activities

WASHINGTON, D. C., March 6, 1944—A revised list of essential activities was released today by the War Manpower Commission. All changes up to and including January 15, 1944, are included. Announcements of changes have been made from time to time but this is the first complete list published since December, 1942.

The following concerns the pulp and paper industry:—

7. FORESTRY, LOGGING, LUMBERING, AND FOREST INDUSTRIES.—Timber tracts and logging camps, cutting of pulpwood, wood for tanning extract, charcoal, sawmills, veneer, cooperage-stock, planing, and plywood mills, raising of tung oil trees; fire prevention, pest control; forest nurseries and reforestation services; gathering of gums and barks for the manufacture of naval stores and medicinal purposes.

27. PRODUCTION OF PULP, PAPER AND MATERIALS FOR PACKING AND SHIPPING PRODUCTS:

(a) Production of the following pulp, paper, paperboard, and converted products.—Pulp (made from pulpwood and other substances); the following types of paper stock and paper board: Absorbent for impregnation, asphalt laminating, blueprint, box board, butcher papers (untreated and treated), cable and electrical insulation, carbonizing, chart and map (Government), condenser tissue, container board, drafting, filter, fruit and vegetable wrapping tissue, gasket, glassine, grease-proof, gumming, mandrel winding stock, pattern tissue, photographic and other sensitized, rope and jute, safety base stock, sanitary (sanitary napkin stock, toweling stock, napkin stock, toilet tissue stock, hospital wadding stock), shipping sacks stock, tabulating card stock, tracing twisting and spinning, vegetable parchment, waxing, wet machine board, wrapping (machine finished and machine glazed); the following converted products from paper and paperboard: Ammunition and shell cases, carbon, envelopes used for shipping and preserving essential products, fiber drums, gummed paper tape, hospital wadding, laminated waterproof and heavy crepe, liquid tight containers and closures, mandrel wound, mesh cloth and fabrics, napkins, nested paper cups, nested paper food containers (excluding paper plates), paperboard boxes and shipping containers, sanitary napkins, shipping sacks, toilet tissue, towels, twine, waxed, waxed laminated and resin impregnated papers for food munitions, and industrial wrapping.

(b) PRODUCTION OF OTHER MATERIALS FOR SHIPPING AND PRESERVING ESSENTIAL PRODUCTS.—Bagging, jute, meat; bags, textile (except laundry bags); barrels, metal; baskets (Climax, fruit, vegetable); box shooks; boxes (metal, wooden and paperboard); cable, fiber; cans; cases, packing; containers (glass, metal, and wood; caps and closures for such containers); cooperage; cooperage stock (staves, headings, and hoops); cordage; crates; drums (shipping); excelsior; gummed cloth tape; rope; tin cans.

Ontario Paper Co. Offers $1,000 Prize

The Ontario Paper Company, Limited of Thorold, Ontario, announces that it offers a prize of $1,000, to be made through the Technical Section of the Canadian Pulp and Paper Association, for the best method proposed for the utilization of a substantial portion of poplar and/or birch fibre in making newsprint paper.

The object of offering the prize is to stimulate ideas and ingenuity leading to the use of as large a percentage as possible of such woods and to improve the quality and economics of newsprint manufacture. Many of our forests today consist of spruce, balsam, birch and poplar and when cut over the birch and poplar are left standing. This not only depletes the forests of presently used species but builds up increasing forest inventory of poplar and birch. A successful method of pulp manufacture using poplar and/or birch would be an important step towards stabilizing and extending the useful life of our forests.

The value of suggestions made will be weighed in direct proportion to the percentages poplar and/or birch usage made possible. It is considered, as an objective, that usage of 40% or higher might be attained.

The award will be made by a committee to be appointed by the Ontario Paper Company, Limited. Decisions as to the award and any interpretation of the rules and regulations governing the award when made by this committee shall be final.

The following are the rules and regulations:

1. The award will be open for suggestions received before January 1, 1945, and may, at the option of the award committee, be further left open until January 1, 1946.
2. The award is not limited to members of the Technical Section, Canadian Pulp and Paper Association, nor to Canadian residents. Executives of the Ontario Paper Company, Limited, and its subsidiaries, including Quebec North Shore Paper Company, are not eligible. Otherwise submissions from any source will be considered.
3. The winning suggestion, and any other suggestions considered of sufficient merit, together with full submitted details of their application, will be published through the Technical Section, Canadian Pulp and Paper Association. Submission of any suggestion for the award will, by virtue of such submission, give permission to so publish.
4. If the committee does not receive suggestions which it considers of genuine merit, it may decline to grant any award.
5. The Ontario Paper Company Limited does not claim any priority on the rights to the use of either the winning or any other suggestion. The prize is offered to stimulate the use of the woods mentioned in newsprint manufacture.
6. All suggestions and correspondence should be addressed to the Secretary-Engineer, Technical Section, Canadian Pulp and Paper Association, 3420 University street, Montreal, P. Q. It is requested that three copies of suggestions, preferably typewritten, be submitted.

B. C. Mill Plans Post-War Expansion

WASHINGTON, D. C., March 8, 1944—A large pulp and paper mill in British Columbia which represents an investment of about $35,000,000 has planned a post-war development program costing $13,000,000, according to the Department of Commerce.

The plan provides for construction of a kraft mill to utilize waste from fir and cedar and other by-products, additional machinery for increased production of laminated paper, and completion of an existing bleach plant.

PAPER TRADE JOURNAL

Title Reg. U. S. Pat. Off.

Henry J. Berger
EDITOR

No. 118 March 9, 1944 No. 10

COMING EVENTS IN PAPER INDUSTRY

NEW ENGLAND SECTION. Technical Association of the Pulp and Paper Industry—Third Friday of each month at the Roger Smith Hotel, Holyoke, Mass.

DELAWARE VALLEY SECTION. Technical Association of the Pulp and Paper Industry—First Friday of each month at the Engineers Club, Philadelphia, Pa.

LAKE STATES SECTION. Technical Association of the Pulp and Paper Industry—Second Tuesday of each month at the Conway Hotel, Appleton, Wis.

KALAMAZOO VALLEY SECTION. Technical Association of the Pulp and Paper Industry—First Thursday of each month at the Park, American Hotel, Kalamazoo, Mich.

CHICAGO PROFESSIONAL PAPER GROUP—First Monday of each month except July and August at Chicago, Ill.

PUBLIC ECONOMY

War requires huge expenditures even when common sense economy is used in the administration of vast appropriations to achieve victory. It has been declared many times by many critics of the Roosevelt Administration that it has never made any serious attempt to institute or to observe economies within its power. In fact, much criticism has been directed to the explanation of some preminent spokesmen for the administration that there is no real danger if the national debt rises to considerably more than two hundred billion dollars. Senator Harry F. Byrd of Virginia, has long criticized waste in the Federal spending program. In his speech on January 26 at the thirteenth annual meeting of the New Jersey Taxpayers Association, Senator Byrd assailed the Administration's fiscal policies.

Senator Byrd said in part: "For ten years we indulged in the costly experiment of spending for spending's sake: of borrowing colossal sums without regard to the benefits or services received—all of this to increase the purchasing power of the public by spending the public's money, to lift ourselves by our bootstraps. It has failed, as every such program has failed since the beginning of time. The result was that every department of the Government, big and little, became inoculated with the germ of waste and extravagance. Those officials who could waste the most were rewarded by promotions and higher responsibilities. Those who attempted to economize were frowned upon and discouraged. When the necessity came for preparing this country for war, these same wasteful policies were carried into the war effort in a new field of greatly enlarged expenditures. This is the chief reason why this war is costing us very much more than it should."

Declaring that at Washington "We have the greatest bureaucracy of all time", Senator Byrd continued: "This bureaucracy has nearly 3,000,000 paid employees. This number represents the civilian civil service employment of the United States Government. It is nearly three and one-half times greater than the peak of the Federal employment in the last world war. The annual payroll of this civilian bureaucracy is eight billion dollars. This is about twice as much as the total cost of all operations of the Government in 1932, including the Army and Navy."

Public economy is patriotism, Senator Millard E. Tydings of Maryland, declares in an article under that title, in the February issue of the *Tax Front*, published by The Tax Foundation, 30 Rockefeller plaza, New York. "When we contemplate," Senator Tydings said, "that the end of the war will leave us a national debt of around $300,000,000,000—a first mortgage of $10,000 on every home in the land—we know instantly what must be established in the post-war era as the last hope for a continuance of our political institutions, for our high standard of living and for the scores of freedoms which are ours traditionally. Here on the home front, economy is patriotism. Public economy is second only to the war effort in keeping our institutions strong and healthy, or, to state it in simpler terms, in safeguarding the opportunity which gives to the everyday man in this country the best chance for himself, his family and his neighbors. Extravagance, waste, and inefficiency in administration which breeds waste, will sabotage the American standard of living, will be the cause of unemployment, the shackling of free business enterprise, and will make a vertible farce of the immeasurable sacrifices which our dead contributed in Africa, Europe and the Southwest Pacific."

Emphasizing the urgent need for economy in the national government, Senator Tydings goes on to say that, "Every possible non-war expenditure must be either cut to the bone or completely eliminated. That is the only way, in the face of the tremendous appropriations, that any economy and any lightening of the future burden can be accomplished at all. When appropriating for war purposes every single dollar that is needed, we must follow these appropriations through and see that they are expended for the purpose for which they are made; that the cancer of extravagance, of overlapping duplication or poor administration be cut out wherever it is detected. Abolition of the CCC, NYA and WPA was not accomplished without a battle in Congress. But they were ended by a determined opposition with the result that a billion and a half dollars were saved for the fiscal year just ended without any appreciable hardship to anyone. When these matters come up in action in the Senate, those who opposed these needed economies pointed out that the depression-born agencies had done a good job. The question then, as now, is not whether some good will flow from an approp-

riation, but whether it is necessary in the public interest. . . . To realize how overwhelmingly necessary it is for us to cut down every non-essential expenditure, it may be well to take a brief look at the post-war picture. Aside from the great national debt, there will be other debts: those of the states, cities and counties; the personal debts, and those of the corporations."

In conclusion Senator Tydings said: "The proponents of deficit spending are strong in both parties and firmly organized. If we would win this fight to save the America we love, not only for ourselves but for the 10,000,000 young men and women in uniform, we must all take up our battle stations right now. The hour has struck, the time for action has come. Government economy is patriotism! Let us therefore secure it as speedily as is humanly possible."

George H. McGregor Joins Swenson Staff

George H. McGregor, until recently senior chemical engineer in the Pulp and Paper Section of the U. S. Forest Products Laboratory, Madison, Wis., has joined the staff of Swenson Evaporator Company, Division of Whiting Corporation, Harvey, Ill., in the capacity of manager of their pulp mill equipment department.

Mr. McGregor will have charge of sales of Swenson equipment for the paper and pulp industry, including complete black liquor recovery systems, evaporators, pulp washers, etc.

Mr. McGregor is a graduate of the University of Wisconsin and has had many years of experience in the paper field, as instructor, technical director and superintendent of operations.

Production Ratio Report*

(Production as per cent of six-day capacity)

COMPARATIVE WEEKLY SUMMARIES

Current Weeks—1944		Corresponding Weeks—1943	
January 22	89.2	January 23	87.9
January 29	89.2	January 30	87.1
February 5	90.9	February 6	87.2
February 12	89.6	February 13	88.4
February 19 (Revised)	91.2	February 20	89.0
February 26	*89.2*	February 27	91.0

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July
1943	87.2	88.9	89.5	88.7	91.4	84.8	84.3
1944	90.1	*90.6*	...	...	...	...	...

	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1943	91.0	88.3	89.6	89.6	82.0	87.8

COMPARATIVE YEARLY SUMMARIES

	1937	1938	1939	1940	1941	1942	1943	1944
Year to Date	89.4	65.8	78.1	87.8	87.4	104.2	88.0	*90.3*
Year Average	79.8	71.5	83.4	85.6	97.4	90.4	87.8	...

*Based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.

PAPERBOARD OPERATING RATIOS†

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1938	56	63	63	60	60	59	59	69	70	73	67	61	64
1939	65	73	76	74	69	73	68	77	82	91	88	77	77
1940	78	75	74	76	82	85	77	79	78	85	82	77	78
1941	81	88	89	89	91	94	92	98	95	99	98	90	92
1942	102	101	101	95	82	72	68	75	76	81	82	77	84
1943	86	88	94	94	96	94	89	96	94	94	93	87	93
1944	90	96	..	..	..	..	..	..	..	..	..	..	..

Week ending Jan. 22, 1944—93 Week ending Feb. 12, 1944—97
Week ending Jan. 29, 1944—95 Week ending Feb. 19, 1944—96
Week ending Feb. 5, 1944—97 Week ending Feb. 26, 1944—*93*

†Per cents of operation based on "Inch-Hours" reported to the National Paperboard Assn.

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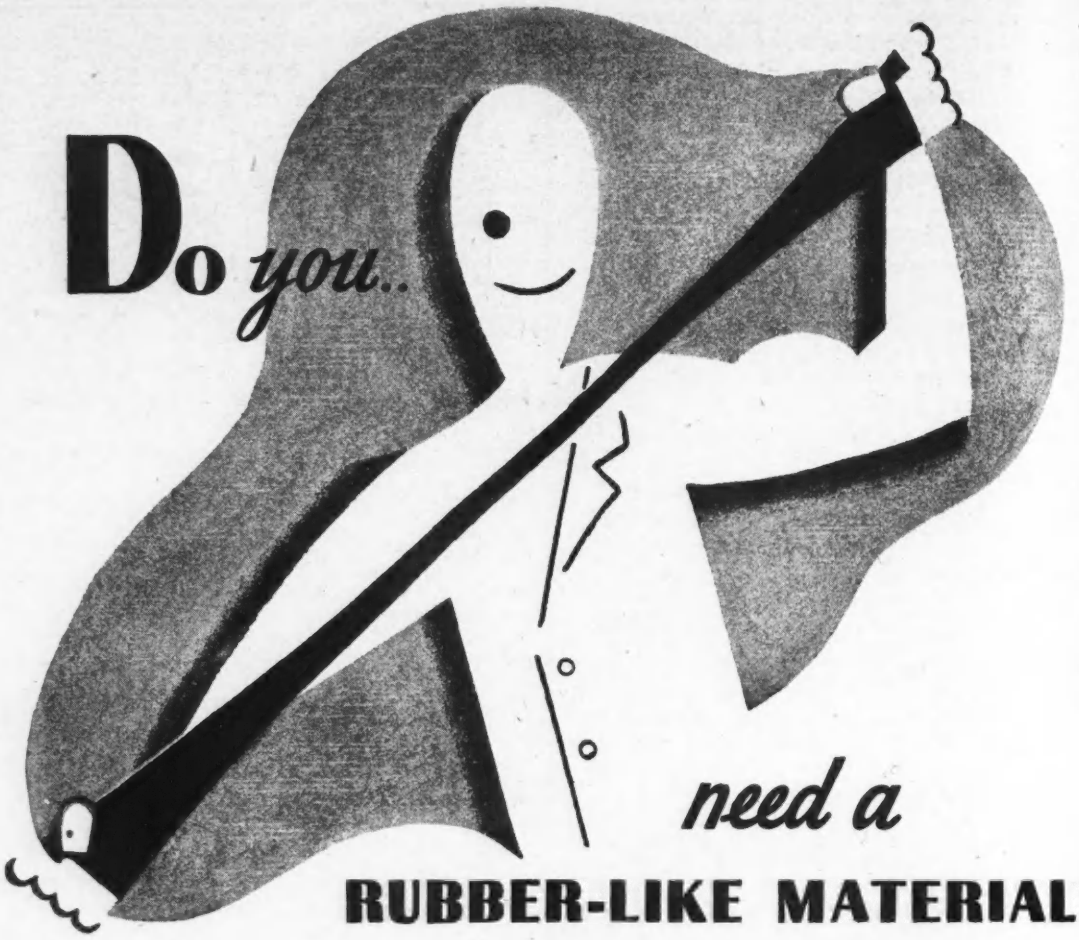

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Creasing of Paper for Water Vapor Permeability Tests*

TAPPI Suggested Method T 465 sm-44

This method is for the creasing of papers and other thin sheet materials. Its purpose is to provide reproducibly creased specimens for water vapor permeability testing. In most instances, especially for small packages, the water vapor permeability of the creased samples gives better indication of expected performance when used as a protective barrier than the permeability of an uncreased sample. Comparison of the water vapor permeability of creased specimens of a sample with that of uncreased specimens of the same sample yields an evaluation of the flexibility of the sample insofar as that property enters into the loss of the moisture-protective quality of materials during the manufacture of bags and case liners and during the overwrapping of packages. The method is not applicable to paperboards.

The procedure described is for creasing specimens with areas from about 60 to 133 sq. cm. (9.3 to 20.6 square inches) or more, although it may be adapted to smaller areas. When performed as specified, the creasing pressure is 1.0 (to 1.03) kg. per cm. of crease (5.85 to 6.0 pounds per inch) applied for 10 to 15 seconds, and the ratio of total length of the creases formed to the effective area of the test specimen is 1.0 (to 1.05) in centimeters and square centimeters or 2.54 (to 2.67) in inches and square inches.

Apparatus

1. *Creasing Surface,* consisting of a flat rectangular plate (e.g., a piece of machined metal plate about ¼ inch thick or a piece of plate glass) whose width shall be at least 1 inch greater than the length of the specimens to be creased.

2. *Creasing Platen,* consisting of a suitably loaded, flat, square, metal or glass plate whose length is about ½ inch greater than that of the specimens to be creased. Its weight in kilograms shall equal the length in centimeters of the specimens to be creased (in pounds, approximately six times the length in inches). For convenience, a handle for carrying and tilting the platen should be provided.

3. *Flat Strip of Wood or Metal* to give the specimen a preliminary light crease.

Test Specimen

The test specimens, obtained according to TAPPI Standard T 400 m, shall be cut into squares having edges parallel to the principal directions of the material and of suitable size for enabling a disk for the water vapor permeability test to be cut from each. The specimens shall be conditioned according to TAPPI Standard T 402 m.

Procedure

Make the creases in an atmosphere conditioned according to T 402 m. Mark off two adjacent edges of the square specimen at uniform intervals approximately ¾ inch apart, the two middle divisions along each edge being symmetrically spaced about the center of the specimen. Fold the specimen across at the first mark parallel to the adjacent edge and *lightly* crease the fold by pressing a flat strip of wood or metal upon it. Tilt the creasing platen and slip the folded specimen under it and parallel to its edge until the fold lies under the center of gravity of the platen. *Gently* lower the platen to rest on the specimen, leave for 10 to 15 seconds and then remove. Unfold the specimen, then fold and make a new crease parallel to the first crease at the next mark along the edge, but make this fold about the side of the sheet opposite to that about which the first fold was made. Repeat this process, unfolding the sheet each time and refolding and creasing at the next mark, alternating the side of the specimen about which the fold is made, until creases have been made through all the marks on one edge of the specimen. The specimen then has a zig-zag fold and appears like the side of an extended camera bellows. Repeat the entire process along the adjacent edge to produce a similar set of creases intersecting the first set at right angles.

Note: While a spacing of ¾ inch will give substantially the required ratio of length of crease to area for the range of specimen sizes mentioned, the exact spacing may be found by geometrical construction, using the "trial and error" method. The smaller the specimen, the more accurately must the proper spacing of the creases be achieved in practice in order to approach the specified rate satisfactorily.

Using a circular template or cutter, trim the specimen into a circle of the desired size for the water vapor permeability apparatus, the center of the circle so cut being situated at the middle of the center square formed by the creases.

Reference

Paper Trade J. 118, No. 2:30 (Jan. 13, 1944).

* This method is suggested by the Paper Testing Committee as being the most suitable to date. It is not, however, a TAPPI Standard. Criticisms are earnestly requested and should be sent to R. G. Macdonald, Secretary, Technical Association of the Pulp and Paper Industry, 122 E. 42nd St., New York, N. Y. Reprints of this method may be obtained from the Secretary at 25 cents each.

The Action of Nitrogen Dioxide Upon Unbleached Pulp. Part II*

By Emil Heuser[1] and Charles M. Sigvardt[2]

Abstract

In connection with a study of the use of nitrogen dioxide as a pulp bleaching agent, published in a previous paper, results of an investigation are presented which was undertaken to ascertain the extent to which nitrogen dioxide attacks the cellulose constituent of the pulp while the lignin is being modified and solubilized. It is shown that delignification and degradation occur simultaneously but that the latter proceeds at a somewhat slower rate than the former. The essential factor for accomplishing substantial delignification is temperature, regardless of other conditions. All samples treated with nitrogen dioxide contain appreciable quantities of nitrogen which seems to support the hypothesis, suggested in the previous publication, that the first phase of the reaction consists chiefly of the nitration of the lignin residue. Further results do not seem to be in disagreement with the assumption that the second phase consists of the oxidation of the nitrolignin which thus becomes soluble in dilute alkali.

In a previous paper (*1*), the possibility of using nitrogen dioxide, either as such or in combination with nitric acid, as a bleaching agent has been discussed. In the present paper, results are presented of a study which was undertaken to ascertain the extent to which nitrogen dioxide attacks the cellulose while the lignin is being modified and solubilized.

Delignification and degradation of the pulp were followed over a certain range of time, keeping the ratio of nitrogen dioxide to pulp and the temperature constant. In addition, the reaction was followed by determining the nitrogen which had entered the pulp under these conditions. Another variable was the moisture content of the pulp. Treatments were carried out on samples of pulp having 1 and 6% moisture content and in an aqueous suspension of 3% consistency. In the latter case, the temperature was varied, 20 and 90° C. being used. All samples treated in this manner were washed with water and were subsequently extracted with 1% sodium hydroxide solution at 55° C. for 1 hour.

An unbleached Mitscherlich pulp was used. As the object of the present study was not to perform a bleaching procedure, the pulp was used in shredded form to make it more uniformly accessible to the gaseous reagent. A Gösta Hall shredder was used.

* Presented by title at the Army and Navy Requirements Conference of the Technical Association of the Pulp and Paper Industry, Palmer House, Chicago, Ill., Sept. 21-24, 1943.

A portion of a thesis submitted by the junior author in partial fulfillment of the requirements of The Institute of Paper Chemistry, for the degree of Master of Science from Lawrence College, Appleton, Wis., May, 1942.

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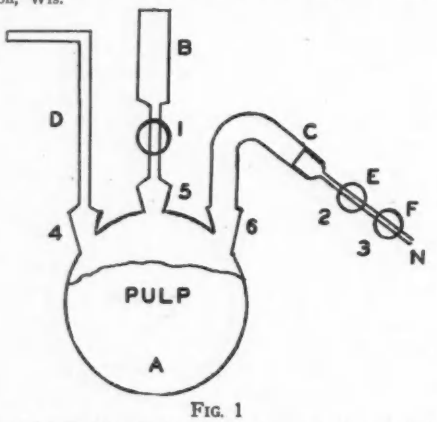

FIG. 1

Apparatus for Treating Pulp with Nitrogen Dioxide. 1, 2, 3. Two-way stopcocks. 4, 5, 6. Ground-glass joints.

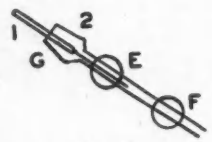

FIG. 2

Apparatus for Introducing Nitrogen Dioxide into the Flask. 1. Nitrogen dioxide ampoule. 2. Male ground-glass joint.

Apparatus and Procedures

The treatments were carried out in an apparatus which allowed control of the reaction. The essential part (Fig. 1) consisted of a 1000-ml. reaction flask (A); to this was attached a 50-ml. graduated funnel (B) with a two-way stopcock for the introduction of water for washing the treated pulp after the reaction was finished, as well as a device (C) for introducing into the pulp in the reaction flask a certain weighed quantity of nitrogen dioxide. The third opening of the flask (D) led to a vacuum pump.

The quantity of nitrogen dioxide used in each experiment was introduced by means of a small glass ampoule. One end of a piece of glass tubing, 5 mm. in diameter, was sealed off by heat; after cooling, the tube was weighed. Nitrogen dioxide from a cylinder was allowed to drop through a small glass funnel into the tube, which was cooled in an ice bath (nitrogen dioxide boils at a temperature of 21.6° C.). The open end of the tube was drawn out into a capillary and the ampoule again placed in the ice, to allow the gas from the capillary to collect in the main body of the ampoule. The tip of the capillary was then sealed by drawing off a small length. All pieces of glass removed from the previously weighed glass tubing were saved and weighed together with the sealed ampoule. The difference between the two weights gave the quantity of nitrogen dioxide used.

The contents of the ampoule were emptied by breaking it with the aid of the device C. This device is shown in detail in Fig. 2. It consisted of a male joint (G), welded onto two stopcocks (E and F) which were joined by a glass tube. The capillary portion of the ampoule was inserted through the bore of the male joint into the longitudinal path of stop-

cock E. After the device had been inserted into the female joint of the reaction flask (C, Fig. 1) and both parts had been tightly fastened by hooks and rubber bands, stopcock F was closed and stopcock E turned. In this way, the capillary portion of the ampoule was broken and the nitrogen dioxide liberated. By passing dry carbon dioxide through N and stopcock F (Fig. 1) and by turning stopcock E, the gas was driven into the reaction flask. A slight suction from the vacuum pump facilitated this procedure.

The amount of nitrogen dioxide employed in each experiment varied from 0.3 to 0.4 gram for 15 grams of air-dry pulp. This corresponded to approximately 2.3% of the weight of the pulp, the ratio of nitrogen dioxide to pulp being about 1 :43. The reaction times were 15, 40, and 80 minutes at room temperature.

At the completion of the various reaction times, water was sucked from the funnel (B, Fig. 1) through the stopcock into the reaction flask. The flask was then separated from the rest of the apparatus, and the pulp was washed on a Büchner funnel with tap water at 55° C. until it was neutral to litmus paper. About 2 liters of water were required. The washed pulp was then broken up and air dried. The extractions with caustic soda solution were carried out with the moist material.

When the pulp was used in slush form, nitrogen dioxide was dissolved in water and the solution was immediately introduced through the funnel (B, Fig. 1) into the 3% consistency suspension in the reaction flask. The mixture was allowed to stand at 20 and 90° C. for 80 minutes. The treated pulp was then removed from the reaction vessel and washed thoroughly with water on a Büchner funnel. The extraction with caustic soda solution was carried out on the moist pulp as described above.

The delignification of the pulp was followed by subjecting the treated samples to lignin determinations (TAPPI Standard T 222 m-43) and to permanganate number tests (TAPPI Standard T 214 m-43). To overcome filtering difficulties encountered with the lignin precipitates, the standard method was modified by decreasing the pulp sample and the quantity of sulphuric acid to one-half the amount specified and by centrifuging the final lignin suspension at 3000 r.p.m. for 10 minutes. The results were of sufficient reproducibility.

The degradation of the pulp was ascertained by estimating its viscosity in cuprammonium hydroxide solution according to TAPPI Standard T 206 m-37.

The nitrogen content of the pulp was determined by digesting the sample in a Kjeldahl flask with hydriodic acid and red phosphorus and estimating the resulting ammonia by the method described by Allen *(2)*.

Discussion

The analytical data are presented in Table I. An inspection of the data referring to the water-washed samples of Series I and II shows that delignification and degradation occurred simultaneously, but that the latter proceeded at a somewhat slower rate than the former. During the first 15 minutes, the lignin content of the pulps dropped about 30%, whereas the viscosity decreased only 14 to 25%. At the end of the 80-minute periods, the lignin content had decreased 50 to 60% and the viscosity 40 to 47%. When the viscosities of these two series are compared, it is seen that they were somewhat lower for the 6% moisture pulp, which seems to indicate that the higher moisture content favored the hydrolytic attack. No direct relationship could be established between the permanganate numbers and the lignin contents. Hot caustic extraction lowered the lignin contents and the permanganate figures only slightly, which seems to indicate that the solubilization effect was rather limited under the conditions used in the first two series. It appears noteworthy that the viscosities were lower for the caustic-extracted than for the water-washed samples. Since hot caustic soda solution must be expected to dissolve low-chain material, the opposite would have been expected. Thus, it would appear that, in addition to the dissolution of short-chain material, the remaining chains were attacked by the hot caustic in some manner. As an explanation, it is suggested that, under the conditions used in the first two series, some hydroxyl groups in position six of the anhydroglucose units of the chains were oxidized to carboxyl groups to form oxycellulose chains. Yackel and Kenyon *(3)* have shown that nitrogen dioxide oxycellulose is rather sensitive to hot alkali and breaks down to short-chain fragments. If such a break-down occurred with the nitrogen dioxide-treated samples upon hot caustic extraction, it would produce a lower viscosity. Finally,

TABLE I.—DELIGNIFICATION AND DEGRADATION OF UNBLEACHED SULPHITE PULP BY NITROGEN DIOXIDE

	Pulp Used, g.	NO_2 Used, g.	Lignin in Treated Pulp, %	Nitrogen in Treated Pulp, %	Viscosity, cp.	Permanganate Number
Untreated pulp			2.63	0.011	92	15.7
SERIES I. PULP WITH 1% MOISTURE						
15-Minute Treatment						
After washing with water	16.48	0.3672	1.85	0.0368	79	13.6
After caustic extraction	12.30	0.2830	1.48	0.0339	60	13.2
40-Minute Treatment						
After washing with water	15.52	0.3560	1.67	0.1086	71	14.8
After caustic extraction	14.90	0.3471	1.36	0.0815	51	13.2
80-Minute Treatment						
After washing with water	16.60	0.3859	1.29	0.0342	56	14.6
After caustic extraction	17.00	0.3977	1.38	0.0344	45	12.9
SERIES II. PULP WITH 6% MOISTURE						
15-Minute Treatment						
After washing with water	13.52	0.3135	1.85	0.0839	69	14.3
After caustic extraction	11.31	0.2608	1.50	0.0544	61	12.8
40-Minute Treatment						
After washing with water	14.88	0.3399	2.10	0.0624	67	13.0
After caustic extraction	10.58	0.2422	1.23	0.0557	54	11.0
80-Minute Treatment						
After washing with water	13.50	0.3130	1.12	0.0600	49	12.9
After caustic extraction	12.75	0.2943	1.20	0.0552	44	10.8
SERIES III. PULP IN AQUEOUS SUSPENSION						
80-Minute Treatment, 20° C.						
After washing with water	14.05	0.3270	1.80	0.1510	61	14.4
After caustic extraction	14.05	0.3270	1.00	0.1048	78	12.6
80-Minute Treatment, 90° C.						
After washing with water	14.05	0.3270	0.60	0.1502	40	6.8
After caustic extraction	14.05	0.3270	0.34	0.0865	42	4.6

the data show that in general, the effect of the nitrogen dioxide treatment increased with time, although the differences were small.

The results obtained with the pulps in slush form at 20° and 90° C. (Series III) and a comparison of these results with those obtained in Series I and II clearly show that temperature is the essential factor, regardless of the amount of water present in the system. In fact, substantial delignification was accomplished only at the high temperature, which confirms the findings reported in the foregoing paper. At 20° C., the slush pulp, treated for 80 minutes and washed with water, contained only slightly less lignin than the 6 and 1% moisture pulps had after treatment for 80 minutes at the same temperature

(1.00 compared with 1.20 and 1.38%). However, only 0.60% lignin remained in the slush pulp which had been treated for 80 minutes at 90° C. This amounts to a reduction of 77% of the original lignin content of the pulp (2.63%). The permanganate figure of 6.8 for the slush pulp treated at 90° C. seems to be more in line with the degree of delignification, and the hot caustic extraction brought about a more substantial reduction of the two values than was observed with the pulps of Series I and II. The viscosity of the slush pulp treated for 80 minutes at 20° C. was higher than was found with the 6 and 1% moisture pulps treated under the same conditions of time and temperature, obviously a result of the considerably lower acid concentration existing in the slush pulp system. However, the treatment at 90° C. lowered the viscosity from 61 to 40, a reduction which would be expected. That the viscosity of the slush pulp treated at 20° C. was distinctly higher after the hot caustic treatment—in contrast to the behavior of the 6 and 1% moisture pulps—may, nevertheless, be explained on the same basis. It may be assumed that the substantial dilution in the slush pulp system represents a condition which is less favorable to the formation of nitrogen dioxide oxycellulose. Thus, the cellulose chains which remained after the short-chain material had been dissolved in the hot caustic were even less sensitive to further attack by this agent. The fact that the viscosities of the slush pulp treated at 90° C. were practically the same before and after hot caustic treatment is difficult to explain, unless the assumption is made that the short-chain material (which, no doubt, must have been present in greater amounts in the pulp treated at the higher temperature) had become water soluble, leaving none which would dissolve in hot alkali. However, this explanation needs further experimental evidence for its support.

The data in the table show that all pulp samples contained measurable amounts of nitrogen. If these values are calculated on the lignin content of the samples, they become quite substantial and seem to support the statement made in the foregoing paper *(1)*: that a number of nitro groups has entered the lignin residues in the pulps. On the other hand, the nitrogen values are too erratic to correlate them with the degree of delignification. The only statement that can be made is that, in general, the nitrogen contents are lower after the hot caustic treatments and that the reduction is greatest with the slush pulp which had been treated at 90° C.

Although more experimental work is necessary, the results reported here do not seem to be in disagreement with the hypothesis suggested in the foregoing paper *(1)* that the action of nitrogen dioxide upon unbleached pulp proceeds in two phases, the first of which consists chiefly in nitration of the lignin residue and the second in the solubilization of the nitrolignin by oxidation.

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Apparatus for Measuring Gas Transmission Through Sheets and Films*

By H. Russell Todd[1]

Abstract

A simple volumetric apparatus for measuring the transmission of gases through sheets and films is described. The sensitivity of the apparatus is shown to be approximately 0.019 cc. per 100 sq. in. per 24 hours for a 24-hour period.

The permeability of ethyl cellulose to air was found to vary with temperature and humidity conditions. In dry air the transmission rate at 36.7°C. was more than double the rate at 1°C. Humidity had the effect of decreasing air transmission through ethyl cellulose, whereas it markedly increased the transmission rate through regenerated cellulose.

The packaging industry views the rapid strides which are being made in the development of new plastics with increasing interest. Plastics have served in the container field as wrappings, liners, bags, and in laminated combinations, and with the progress which is being made in the development and improvement of these materials, their use in packaging and container manufacture is likely to be more important in the future.

The protection of many packaged products depends on the prevention of water vapor transfer through the container. The importance of moisture resistance in packaging materials is quite generally recognized and needs no emphasis here. Gas permeability, however, seems to have received less attention than it deserves. Food products, as well as certain nonfood products may be adversely affected by atmospheric oxygen since oxidative changes often result in rancidity, discoloration, or loss of flavor and nutritive value.

The ideal plastic for packaging purposes must, therefore, among other things be gasproof as well as waterproof. Many of the plastic materials fail to meet these requirements and, consequently, efforts are being made by the various manufacturers to improve their products with respect to these properties.

Although satisfactory methods have been developed for measuring water vapor transfer, suitable methods for measuring the gas transmission rate have been lacking. It was to meet the latter need that the present work was undertaken.

Measurement of Gas Transmission

In 1920 Edwards and Pickering *(1)* working at the Bureau of Standards employed a gas interferometer for determining the permeability of rubber balloon

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* Presented at the Army and Navy Requirements Conference of the Technical Association of the Pulp and Paper Industry, Palmer House, Chicago, Ill., Sept. 21-24, 1943.

fabrics to gases. In their method the fabric to be tested was inserted between the two parts of a cell, one part of which was slowly swept out by the test gas while the other part was continuously swept out by a reference gas, usually air. From the difference between the refractive index of the pure reference gas and that of the reference gas containing the test gas transmitted through the fabric, the rate of the gas transmission was calculated.

An instrument called a "Fabric Permeameter" *(2)* has recently appeared on the market. Unlike the gas interferometer, this apparatus utilizes the difference between the thermal conductivity of the test gas and air for measuring gas transmission. It was designed principally for examining relatively porous membranes such as coated and impregnated fabrics.

Morris and Street *(3, 4)* studied the effect of various conditions on the permeability of rubber to air. In their apparatus the air, under pressure, passed through the rubber membrane into a partially vacuumized portion of the cell, which was connected to a manometer. Mineral oil was used in the manometer to increase the sensitivity, and the rate of drop in the manometer was taken as an index of the gas permeability.

While the present work was in progress there appeared in the literature an article by Elder *(5)* describing a method involving principles similar to those described herein, but differing in certain respects. Elder's apparatus was designed to measure the gas transmission of film materials of low permeability, such as plastic sheets, by means of a manometric method. Briefly, his apparatus consists of a cell that opens downward into a short capillary tube, which, in turn, is attached to an upright, closed manometer. This part of the system is highly vacuumized while the upper part of the film may either be left open to the air or may be enclosed and the air replaced by another gas. The rate of permeability of the gas through the film is indicated by a difference in the mercury levels in the capillary and manometer tubes.

The method described herein differs from that described by Elder in that it utilizes the volumetric rather than the manometric principle in the measurement. The volumetric method offers some advantage by the fact that the test proceeds under a constant pressure differential and the gas transmission rate is constant throughout the duration of the test.

If a differential in the pressure of a gas is maintained across a plastic sheet, the gas, if transmitted by the sheet, will pass from the high to the low pressure side. The rate of transmission may be determined by measuring the rate of change in the gas volume or gas pressure on either side of the sheet. As previously indicated, the measurement of volume change has the advantage of maintaining a constant pressure differential across the sheet during the test period. The volume of gas transmitted through the sheet is measured directly by the movement of a column of mercury or other suitable liquid through a horizontal glass capillary tube of known cross-sectional area. The sensitivity of the apparatus is increased by having the volume of gas on the measuring side of the apparatus as small as possible.

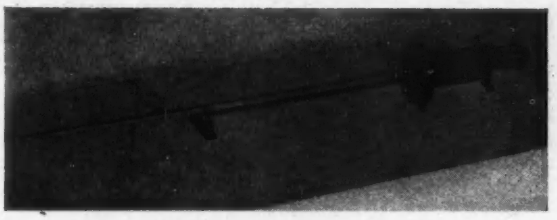

FIG. 2
Gas Transmission Apparatus Assembled

Apparatus

Utilizing the above principles, an instrument was constructed which provides a chamber having a volume of about 10 cc. on one side of the plastic sheet and one of 500 cc. on the other side. The larger chamber is vacuumized, while the smaller chamber is maintained at atmospheric pressure. This differential in gas pressure in the two chambers results in the movement of gas through the sheet being tested; consequently, the column of liquid in the horizontal capillary tube moves in to displace the gas transmitted from the small chamber. The volume of gas transmitted is thus measured directly. Since it requires the transmission of only about 2 cc. of gas to move the liquid column through the length of the graduated capillary tube, the pressure differential remains practically constant during the test.

The apparatus is shown in Figs. 1 and 2. The two parts of the apparatus, which face against the plastic sheet, are bolted together. Rubber gaskets between the metal and plastic surfaces provide a gas-tight seal. These gaskets, which were made from rubber composition (Garlock No. 22) are 1/16 inch thick, 3/8 inch wide, and have an inside diameter of 3 inches. They are cemented in grooves cut 1/32 inch deep in the face of each flange, leaving one-half the thickness of the gasket above the face. Eight bolts

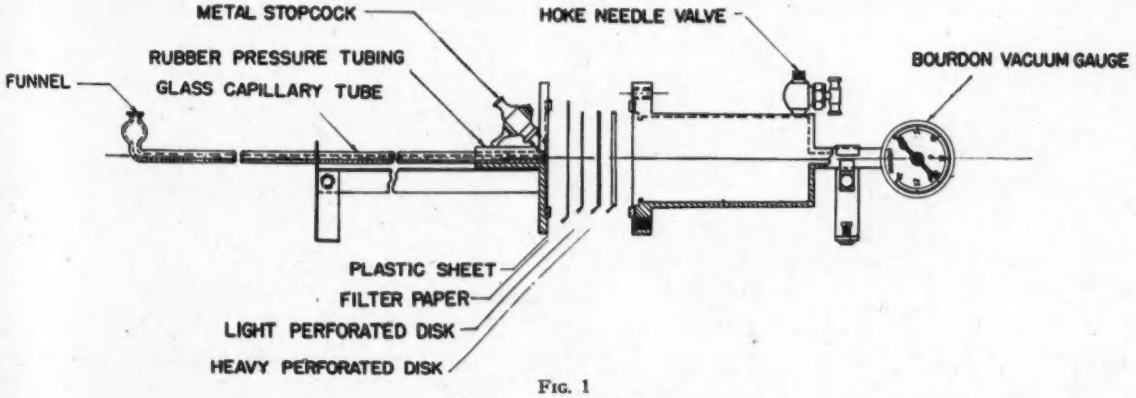

FIG. 1
Gas Transmission Apparatus

evenly spaced around the outer edge of the flanged parts are used.

The part of the apparatus shown on the right hand side of the plastic sheet consists of a 500 cc. cylindrical, brass chamber having an inside diameter of 3 inches. A Bourdon vacuum gauge is attached to the closed end of this chamber. The vacuum is drawn through a needle valve attached to the top side of the chamber. Two perforated metal disks fit into the open end of the brass chamber to support the plastic sheet. The heavy disk is made of Monel metal and has ¼-inch perforations. The light or top disk is brass and has 1-mm. perforations. A piece of filter paper is placed on the top perforated disk to protect the plastic sheet from contact with sharp edges.

The left half of the assembly consists of a steel disk having a circular section 1/32 inch in depth cut in its inside face. This cut section is 3 inches in diameter and coincides with the inside walls of the brass chamber. Its purpose is to provide a gas space on that side of the plastic sheet over the area under test. A brass capillary tube projects 1 inch from the center of the outside of the steel disk. This is joined to a glass capillary tube 31 inches in length by means of thick-walled rubber tubing. The latter is fastened with four wire bands and then shellacked to insure against leakage. The other end of the glass capillary tube is formed into a small glass funnel which is turned upward so that a small column or globule of mercury or other liquid may be introduced into the capillary, which serves to indicate the movement of gas through the plastic sheet. The glass capillary, which has an inside diameter of approximately 1.8 mm., is graduated horizontally with a millimeter scale. A metal **L** beam attached at right angles to the steel disk supports the glass capillary. A metal stopcock provides an opening through the steel disk. This stopcock is set at an oblique angle so that gas forced into it will flush out the small inside gas volume and pass out through the glass capillary. It is used for the purpose of introducing gases other than air into the system. The apparatus is provided with adjustable legs so that the horizontal capillary tube can be properly leveled.

TABLE I.—EFFECT OF TEMPERATURE, HUMIDITY, AND SHEET THICKNESS ON TRANSMISSION OF AIR THROUGH ETHYL CELLULOSE

Thickness, Inch	Temperature	Humidity Condition	Transmission Rate Cc./100 sq. in./24 hr.	Specific Permeability Cc./sq. cm./min./cm. thickness × 10^{-6}
	Deg. C.			
.0195	36.7	Moist	26.30	1.40
.0189	36.7	Moist	26.81	1.39
.0189	36.7	Moist	28.72	1.48
.0099	36.7	Moist	46.21	1.25
.0099	36.7	Moist	46.62	1.26
.0097	36.7	Moist	46.36	1.23
.0033	36.7	Moist	136.3	1.23
.0033	36.7	Moist	140.6	1.27
.0033	36.7	Moist	146.7	1.32
.0011	36.7	Moist	334.2	1.24
.0011	36.7	Moist	374.7	1.39
.0011	36.7	Moist	680.0*	2.52*
.0194	36.7	Dry	50.64	2.69
.0192	36.7	Dry	48.50	2.55
.0192	36.7	Dry	50.00	2.62
.0100	36.7	Dry	82.27	2.25
.0099	36.7	Dry	83.48	2.26
.0096	36.7	Dry	85.41	2.24
.0033	36.7	Dry	251.8	2.62
.0033	36.7	Dry	263.6	2.74
.0033	36.7	Dry	272.1	2.83
.0014	36.7	Dry	565.2	2.49
.0012	36.7	Dry	1,871 *	6.14*
.0011	36.7	Dry	1,473 *	4.43*
.0190	1	Dry	20.48	1.06
.0100	1	Dry	35.46	.96
.0034	1	Dry	117.7	1.09

* High value apparently due to lack of uniformity in very thin sheets.

TABLE II.—AIR TRANSMISSION RATES AND SPECIFIC PERMEABILITIES OF VARIOUS SHEET MATERIALS

Material	Thickness, Inch	Temperature	Humidity Condition	Transmission Rate Cc./100 sq. in./24 hr.	Specific Permeability Cc./sq. cm./min./cm. thickness × 10^{-6}
		Deg. C.			
Regenerated cellulose	.0015	36.7	Moist	29.57	.121
Regenerated cellulose	.0015	36.7	Moist	34.43	.141
Regenerated cellulose	.0014	36.7	Moist	35.21	.132
Regenerated cellulose	.0016	36.7	Dry	5.34*	.0233*
Regenerated cellulose	.0013	36.7	Dry	0.99	.00346
Regenerated cellulose	.0013	36.7	Dry	0.77	.00273
Cellulose acetate	.0213	36.7	Dry	2.85	.163
Cellulose acetate	.0211	36.7	Dry	3.09	.175
Vinylidene chloride	.0156	36.7	Dry	**	
Vinylidene chloride	.0156	36.7	Dry	**	
Vinylidene chloride	.0154	36.7	Dry	**	
Polyvinyl alcohol	.0008	36.7	Dry	**	
Polyvinyl alcohol	.0008	36.7	Dry	**	
Polyvinyl alcohol	.0008	36.7	Dry	.35*	.00076*
Glassine, 30 lb.	.0014	36.7	Dry	2,774	12.2
Glassine, 30 lb.	.0014	36.7	Dry	5,536	23.5
Glassine, 30 lb.	.0014	36.7	Dry	56,836 *	251. *

* High value apparently due to lack of uniformity in very thin sheets.
** No transmission could be observed.

The design of the apparatus has been kept as simple as possible in order that it might be easily duplicated. In the present work three different instruments were assembled and used simultaneously.

Sensitivity

The position of the indicating column in the capillary may easily be read to the nearest 0.5 mm. The inside diameter of the capillary tube is 1.854 mm., so a movement of the column of 0.5 mm. would represent a volume change of .00135 cc. The circular area of film under test is 3 inches in diameter or 7.07 square inches. Therefore, the volume change multiplied by the factor 14.14 gives the gas transmission in terms of cubic centimeters of gas per 100 square inches of film. For a 24-hour period the sensitivity of the instrument is:

$.00135 \times 14.14 = .019$ cc. per 100 sq. in. per 24 hours.

Procedure

The apparatus is assembled by placing the 500 cc. cylindrical chamber in a ring stand, open end up. If the test is to be run in a moist atmosphere, a moistened piece of blotting paper is placed in the cylinder. If a dry atmosphere is desired, a cheese cloth bag filled with anhydrous calcium chloride is used. The perforated metal disks, filter paper, and plastic sample, 3¾ inches in diameter, are fitted over the top end. The other part of the apparatus is then placed in position and bolted down tightly. The plastic samples are conditioned in a closed vessel over water or in a desiccator over anhydrous calcium chloride for not less than 12 hours before testing.

After removing the assembled apparatus from the ring stand, it is placed in a horizontal position and a vacuum slightly above 25 inches of mercury is drawn through the needle valve. It is then placed in a constant temperature cabinet and upon reaching

equilibrium temperature, the vacuum is adjusted to exactly 25 inches of mercury, the pressure differential arbitrarily chosen for all of the tests. When the test is conducted in a moist atmosphere, a column of water is used as indicator in the graduated capillary tube. For the dry state, a column of mercury is used. In the latter case, the capillary tube and accessory parts of the apparatus are flushed out with dry air, the air being introduced through the stopcock and discharged through the capillary tube. The air or other gas is dried by passing it through a tube filled with anhydrous calcium chloride. By these methods the tests may be run with either dry or moist air on both sides of the plastic sheet.

The tests conducted at 36.7°C. were run in a constant temperature cabinet equipped with a mercury-controlled, thermostatic regulator. This cabinet could be maintained within ± 0.1°C. The few tests conducted at 1°C. were run in a cold storage room, where the temperature could not be controlled so accurately.

When a column of water was used as the indicator, equilibrium was maintained quite readily between inside and outside pressures. When a mercury column was used as an indicator, however, equilibrium usually had to be established by tapping the capillary tube with a pencil, because of the tendency of the mercury to adhere to the inside walls of the glass tube.

Test Specimens

Gas transmission measurements were made on ethyl cellulose sheets of various thicknesses at 36.7°C. and 1°C. under both high and low humidity conditions. Similar measurements were also made for regenerated cellulose with dry and moist air at 36.7°C., and for cellulose acetate, vinylidene chloride, polyvinyl alcohol, and glassine with dry air at 36.7°C.

All of the gas transmission measurements were conducted under a differential pressure of 25 inches (635 mm.) of mercury. The thickness of each sheet represents the average of ten readings to the nearest .0001 inch. The gas volumes were calculated to standard conditions of 0°C. temperature and 760 mm. mercury pressure. The gas transmission rate has been expressed as cc. per 100 square inch per 24 hours and the specific permeability as cc. per sq. cm. per minute per cm. thickness. The results of these measurements are presented in Tables I and II, and summarized in Table III. The summarized data in Table III represent the average values taken from the data in Tables I and II. The excessively high values for the thin sheets, explained in the footnotes of Tables I and II, were not included in these calculations.

TABLE III.—SUMMARY OF AIR TRANSMISSION RATES AND SPECIFIC PERMEABILITIES OF VARIOUS PLASTIC SHEETS AND GLASSINE

Material	Thickness, Inch	Temperature Deg. C.	Humidity Condition	Transmission Rate Cc./100 sq. in./24 hr.	Specific Permeability Cc./sq. cm./min./cm. thickness × 10^{-4}
Ethyl cellulose	.0191	36.7	Moist	27.28	1.39
Ethyl cellulose	.0098	36.7	Moist	46.40	1.25
Ethyl cellulose	.0033	36.7	Moist	141.2	1.27
Ethyl cellulose	.0011	36.7	Moist	354.4	1.31
Ethyl cellulose	.0193	36.7	Dry	49.71	2.62
Ethyl cellulose	.0098	36.7	Dry	83.72	2.25
Ethyl cellulose	.0033	36.7	Dry	262.5	2.73
Ethyl cellulose	.0014	36.7	Dry	565.2	2.49
Ethyl cellulose	.0190	1	Dry	20.48	1.06
Ethyl cellulose	.0100	1	Dry	35.46	.96
Ethyl cellulose	.0034	1	Dry	117.7	1.09
Regenerated cellulose	.0015	36.7	Moist	33.07	.131
Regenerated cellulose	.0013	36.7	Dry	.88	.00309
Cellulose acetate	.0212	36.7	Dry	2.97	.169
Vinylidene chloride	.0155	36.7	Dry	**	
Polyvinyl alcohol	.0008	36.7	Dry	**	
Glassine, 30 lb.	.0014	36.7	Dry	4,155	17.8

** No transmission could be observed.

Results

The specific permeability values for ethyl cellulose sheets of various thicknesses appear to be constant under constant temperature and humidity conditions; in other words, the gas transmission rate varies directly with the thickness of the sheet. It is also interesting to note that in the case of ethyl cellulose, the higher temperature accelerates the gas transmission rate while the higher humidity slows down the rate. In the case of regenerated cellulose the higher humidity greatly increases the rate of transmission. This indicates a decided difference in the effect of moisture on the transmission properties of these two plastics. Oswin *(6)* states that there is about 5% linear expansion when dry regenerated cellulose film is wetted. The pore-size of regenerated cellulose has been estimated by Morton *(7)* to be 5A in the dry state and 20A in the wet state.

The results obtained with the thinnest sheets (.001 inch) indicate that lack of uniformity in the membrane resulted in excessively high transmission rates. This effect is similar to that observed by Edwards and Pickering *(1)*, who noted that rubber films 0.2 to 0.3 mm. in thickness showed higher permeability than corresponded to a linear relation between permeability and thickness, and attributed it to nonuniformity in the very thin material. The results of triplicate determinations for the thicker sheets checked within 8%. The time required for conducting the tests varied from a few seconds to 26 hours, depending on the permeability rate. The amount of air transmitted in three tests on vinylidene chloride and two tests on polyvinyl alcohol during a 17-hour period was not perceptible—at least no movement could be observed in the indicating column in the capillary tube. Calculated on the basis of the sensitivity of the apparatus, this would indicate that the air transmission rate could not have been greater than 0.03 cc. per 100 square inches per 24 hours since that is equivalent to a movement of 0.5 mm. in the indicating column, which is the smallest movement which we would be able to read accurately, as has already been explained.

Studies are in progress on the transmission rate of different gases (H_2, O_2, N_2, CO_2) and mixtures of these with water vapor, through various plastic sheets and films. Since the present work has shown that absorption of moisture by plastics affect their permeability to gases, it seemed advisable to investigate the effect of carbon dioxide, ammonia and other soluble gases in combination with water vapor on the transmission rate for the various plastic films.

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Delaware TAPPI Discusses Plastics

The Delaware Valley Section of the Technical Association of the Pulp and Paper Industry met at the Engineers Club, Philadelphia, Pa. on Friday evening March 3, 1944. W. M. Shoemaker presided as Chairman. The principal speaker was D. T. Jackson of the Hammermill Paper Company who talked on "Some Applications of Pulp and Paper in the Plastics Industry." In this talk Dr. Jackson pointed out that there were three types of plastics involving cellulose; (1) in which the fiber is the basic raw material as in the case of cellulose acetate and ethyl and methyl cellulose; (2) in which the fiber is intimately mixed with resins as filler; and (3) in which a fibrous sheet is coated or impregnated with resins.

In 1944 the per capita consumption of plastics is about what the per capita consumption of paper was in 1800. In 1939 it was a 200 million dollar industry. Plastics of a sort were known in 1000 B. C. Products have been uncovered that were made up of fibrous material such as papyrus bonded together with an adhesive and built up to a considerable thickness.

Dr. Jackson described in detail the impregnation, coating and drying processes and cited the advantages of infrared drying methods. Rag papers were first used but there is a growing application of the use of alpha pulp. Ordinary sulphite papers have been less successful due to their low absorptiveness. A Mitscherlich type of sulphite has found application in the socalled papregs developed by the Forest Products Laboratory. There are at present no known tests that will predict the suitability of a paper for use in plastics. He described the trend toward low pressure laminates in which pressures range from contact to 300 p.s.i.

There was a large attendance at the meeting, indicating the great interest in the subject. The paper of Dr. Jackson will probably be published soon.

Those present included: Edward J. Albert, R. M. Bates, S. G. Briscoe, K. W. Britt, Thomas E. Brookover, W. J. Burke, H. D. Childers, J. D. Clark, C. M. Connor, O. C. Cordes, H. W. Donnelly, J. Edward Doyle, Jacob Edge, J. M. Farnum, H. J. Farra, George A. Farrah, D. Fronmuller, F. G. Felske, John E. Gambol, E. N. Glauner, Jesse F. Good, R. G. Goodwin, Lois V. Hans, J. C. Harper, Sr., Ray E. Harter, Grace Hightower, C. W. Hoffman, Eugene A. Holland, Miss Bessie C. House, Harry Hulmes, D. T. Jackson, Valdemar Jacobsen, George J. Lane, N. H. Langbrey, W. H. Lapp, H. A. Lips, J. Macadam, R. G. Macdonald, G. B. Martin, James Mento, Lewis B. Miller, W. B. Morehouse, Louise E. McGrath, A. H. Nadelman, L. M. Nauman, J. F. Ohlson, Joseph A. Paciello, John Peters, Joseph E. Plumstead, H. F. Ray, J. F. Reardon, M. W. Reuben, C. H. Rice, J. W. Robinson, John Roslund, Claude J. Ryder, J. Carl Schmidt, W. R. Scull, Wm. M. Shoemaker, Chas. A. Shubert, Jay Smith, Mrs. L. Jay Smith, J. K. Staats, E. T. Street, George M. Suydam, R. Temple, Roy H. Underdown, Jack Ward, K. R. Watt, A. E. Waugh, A. H. Webber, Almeron W. Wickham, R. Wiggins, Ray Wilcox, and Albert Wilson.

Chemistry Made Easy

D. Van Nostrand Company has recently published a very interesting set of books entitled Chemistry Made Easy by Cornelia T. and Foster Dee Snell (third printing). There are four volumes entitled: I, The Theory of Inorganic Chemistry (184 pp.); II, Elements and Compounds in Inorganic Chemistry (231 pp.); III, The Aliphatic and Aromatic Compounds of Organic Chemistry (240 pp.); and IV, Chemicals of Commerce (542 pp.). This set of books is being reviewed for the paper industry because there are many men in the mills who have not had the benefit of a technical education who wish to advance themselves and get in a position where fuller utilization of technical knowledge is growing more necessary. Such men will find these books written with this background in mind.

Chemistry for general purpose is not a difficult science to learn but most texts present the subject in a manner that is not fully understandable by a reader who does not have the benefit of laboratory instruction. While the latter is important and vital to anyone who is to engage in research or technical control, it is not a must for the layman who is primarily interested in having a working knowledge of the subject and will have the benefit of working with a trained chemist.

Information gathered by reading books such as these is remembered because of the method of presentation and enable those who take the trouble of educating themselves to this extent to read and understand the many technical articles appearing in the industry's literature and thereby provide a means for a practical papermaker to acquire some of the fundamentals valuable to him as he advances to foreman and superintendent positions.

Copies may be obtained from the Book Department of the Technical Association of the Pulp and Paper Industry for $7.95 for the set of four volumes.

Kalamazoo Discusses Textile Chemistry

R. Feibelmann of the Aktivin Corporation, New York City, addressed the March meeting of the Kalamazoo Valley Section of TAPPI March 2, at the Hotel Columbia in Kalamazoo. The discussion concerned the following subjects; New Modifying Agents for Starches; New Plasticizers for Paper; and New Instruments for the Determination of Available Cholrine in Hypochlorite Bleach Liquors. Dr. Feibelmann particularly described the prevailing application of these subjects to the textile industry, and indicated the trend of the paper industry to utilize much that had proven of value in textiles. The following guests and members attended: Ralph Atkins, Albert F. Bigelow, C. C. Candee, Herbert C. Church, F. D. Elliott, Richard Feibelmann, L. E. Fitzgerald, Myron F. Flotow, Brit Freeman, Charles Gardner, R. C. Germanson, F. R. Hamilton, W. F. Hathaway, J. A. Heenan, Lester H. LaLiberte, Gordon M. Markle, R. T. Mashburn, D. W. McArthur, C. J. McMahon, Jeon H. Mimms, H. E. Nelson, Al Perlick, Marshall Rutz, Al Sherwood, C. C. Schneider, E. B. Taylor, K. R. Tefft, Floyd Thomas, Joe Waber, H. O. Ware, Frank Whittington, Leo A. Willoughby and James A. Wise.

Heads Technical Research Section

J. D. Malcolmson, technical director, Robert Gair Company, Inc., New York, has been appointed to head a new Technical Research Section to be set up in the War Production Board Paperboard Division. The purpose of the new section is to endeavor to relieve the shortage of paperboard for boxes by an objective technical approach to the problem.

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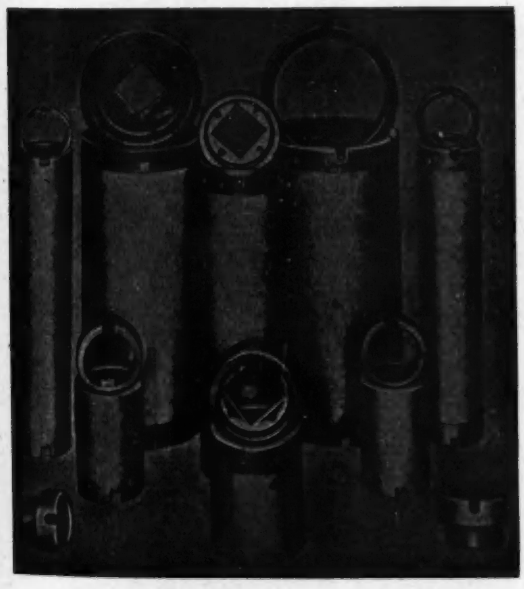

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New York Paper and Pulp Market Review

Paper Market Active With Output Well Maintained—Wood Pulp Situation May Improve In Last Half of Year—Mill Buying of Rags Is Active — Demand For Paper Stock Continues Very Heavy.

Office of the PAPER TRADE JOURNAL.
Wednesday, March 8, 1944.

Orders for paper in the wholesale market are reported at a relatively high level at this date by most of many manufacturers' representatives, jobbers, and general paper merchants.

The paper supply situation should not become more serious and may improve during the second half of this year, unless unpredictable demands increase materially, states the WPB in a press release last week. The requirements of paper and paper products for military use are the uncertain factors in estimates for the second half of 1944.

The index of general business activity for the week ended February 26 rose to 146.8, from 145.5 for the previous week, compared with 140.9 for the corresponding week last year. The index of paper board production was 139.6, compared with 148.6 for the previous week, and with 147.7 for the corresponding week last year.

Paper production for the week ended February 26 was estimated at 89.1%, compared with 91.0% for 1943, with 103.5% for 1942, with 90.5% for 1941, and with 83.5% for the corresponding week for 1940.

Paper board production for the week ended February 26 was 93.0%, compared with 94.0% for 1943, with 100.0% for 1942, with 82.0% for 1941, and with 69.0% for the corresponding week for 1940.

A newsprint surplus of 32,329 tons as of March 1, is the estimate of the WPB, without allowance for "paybacks" and inventories approved but not made. This will be absorbed in due course, with the WPB directing that quarterly consumption and inventory figures be submitted in the future.

Paper and paper board production under WPB Conservation Order M-241, was revoked March 1. The monthly reserve percentages are now as follows: paper, 20%; paper board, 45%, and condenser tissues, 100%.

Wood Pulp

Production of wood pulp in the southern states was retarded by unfavorable weather for cutting pulpwood, the Department of Commerce, states in its last report, and first quarter estimates of 1,073,000 tons will not be met. Cutting in the other four pulpwood regions are close to estimates.

Wood pulp consumption for December 1943, was 5% below November, and 2% below November a year ago, the Department stated.

Rags

Mill buying of new white cotton cuttings is reported active this week, with major demand in new white shirts and in the unbleached grade. Colored cuttings continue active. Prices are strong at ceilings.

Felt mills are reported buying all available supplies of the roofing grades of old cotton rags. Some reports indicate supplies are inadequate to meet current requirements. Prices are firm and unchanged.

Old Rope and Bagging

No important change in the old rope market has been reported this week. Demand for old No. 1 Manila rope is strong, with supplies under requirements.

Trading in scrap bagging continues slow. Current mill buying is in light volume and the level of prices continues under ceilings and of a nominal character.

Old Waste Paper

Mill demand for paper stock continues heavy and the market is strong. Collections in New York City are expected to be increased substantially with the use of the City's trucks for collecting accumulations on Wednesday of each week. Prices on all grades of waste paper are strong at ceilings. Higher prices to cover increased costs, since the OPA price level was put into effect two years ago, are cited by many quarters of the trade as essential to substantially increase collections.

Twine

Demand continues active for all grades of twine. No change in prices or in the market situation has been reported this week. In general, prices are maintained at a firm level.

Asks Printers to Save Waste Paper

Member firms of the New Jersey Paper Merchants Association, W. H. Whitney, executive manager, 11 Hill street, Newark 2, N. J., recently met with the executive secretary for New Jersey of the War Production Board Salvage Division.

They pointed out that waste paper for repulping is a critical item urgently required to supplement the scarcity of wood pulp. It was agreed that the successful operation of all branches of the printing industry depends greatly upon the success of the waste paper salvage program. The printing plant with a big volume can arrange to deliver its waste paper direct to a dealer. To meet the needs of the small shops, members of the association have agreed to collect waste paper whenever they make a delivery to a customer.

Printing plants not purchasing from a member of the association are requested to cooperate with their paper merchant to increase the nation-wide collection drives of paper stock now in progress.

Opens Rich Pulpwood Source

The opening up of the Notre Dame Peninsula, where can be found one of the richest concentrations of pulpwood timber in Newfoundland, has been noted as the most significant development of the past year, according to a report to the Department of Commerce.

Heretofore, small amounts of pulpwood have been taken from this vast forest reserve and moved by boat to Corner Brook some 375 miles away. This method of transport did not prove satisfactory and in 1943 a fourteen mile truckroad, reinforced to withstand the burden of specially designed trucks each weighing seventy tons when loaded, was constructed between Hampden and the Upper Humber River.

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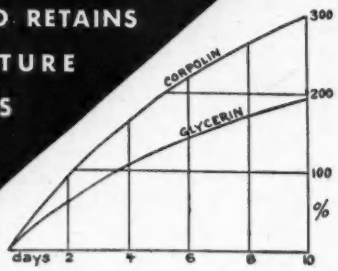

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MISCELLANEOUS MARKETS

Office of the PAPER TRADE JOURNAL,
Wednesday, March 8, 1944.

BLANC FIXE—The market situation in blanc fixe continues to be reported unchanged. Prices are firm. The current quotation is $40 per ton for the pulp, in barrels, at works. The powder is quoted at $60 per ton, f.o.b., works.

BLEACHING POWDER — Current demand for bleaching powder is reported active. Prices are firm and unchanged. Current quotations range from $2.50 to $3.10 per 100 pounds, in drums, car lots, at works.

CASEIN—OPA maximum prices on processed acid-precipitated casein are as follows: 10,000 pounds or more, 24 cents per pound; 2,000 pounds, 24½ cents per pound; less than 2,000 pounds, 24¾ cents per pound, f.o.b., shipping point. Imported 9¾ cents per pound, f.o.b., source.

CAUSTIC SODA—Demand for caustic soda continues to be reported as heavy. Shipments are large, with market indicating little change from tight supply situation. Quotations are firm and unchanged. The current quotation on solid caustic soda is $2.30 per 100 pounds; flake and ground are quoted at $2.70 per 100 pounds, in drums, at works.

CHINA CLAY — Quotations on china clay continue unchanged. Domestic filled clay is quoted at from $7.50 to $15 per ton; coating clay at from $12 to $22 per ton, at mines. Imported china clay is quoted at from $13 to $25 per long ton, ship side.

CHLORINE—Production currently reported adequate to meet allocation needs. Quotations are unchanged. Chlorine is currently quoted at $1.75 per 100 pounds, in single-unit tank cars, f.o.b., works.

ROSIN — Quotations on some grades of rosin are higher this week. "G" gum rosin is currently quoted at $4.55 per 100 pounds, in barrels, Savannah. "FF" wood rosin is currently quoted at $4.46 per 100 pounds, in barrels, New York. Seventy per cent gum rosin size is quoted at $4.82 per 100 pounds, f.o.b., works.

SALT CAKE—The market for salt cake is reported unchanged. Demand continues moderate. Domestic salt cake is currently quoted at $15 per ton, in bulk; chrome cake is quoted at $16 per ton. All prices in car lots, f.o.b., shipping point.

SODA ASH—Larger supply and improved shipping situation reported, but market is still rather tight. Quotations are firm and conform to prevailing prices. Prices on soda ash in car lots, per 100 pounds, are as follows: in bulk, $.90; in paper bags, $1.05; and in barrels, $1.35.

STARCH—Not much improvement in supply of cash corn is reported this week and market is tight at this date. Prices are unchanged. Pearl is currently quoted at $3.72 per 100 pounds; powdered starch at $3.83 per 100 pounds; all prices in bags, car lots, f.o.b., Chicago.

SULPHATE OF ALUMINA — Demand and shipments of sulphate of alumina is reported moderate at this date. Iron free tight, due to restrictions. The commercial grades are quoted at from $1.15 to $1.25 per 100 pounds; iron free is quoted at $2.35 per 100 pounds. All prices in bags, car lots, f.o.b., works.

SULPHUR—Demand for sulphur continues active. Quotations continue unchanged. Annual contracts are currently quoted at $16 per long ton, f.o.b., mines. The current contract quotation at Gulf Ports is $17.50 per long ton.

TALC—Prices on talc are unchanged and continue to conform to prevailing market levels. Domestic talc is currently quoted at from $16 to $21 per ton, at mines.

MARKET QUOTATIONS

All market quotations, excepting those otherwise designated as official OPA maximum prices, are based on the manufacturers' price level as of October 1-15, 1941; maximum wholesale prices are based on the merchants' maximum prices for stipulated quantities at a quoted price to all customers of a like class, as shown by the merchant's sales records of goods delivered during March, 1942. A merchant's price list in effect in March 1942, showing quotations of actual shipments, will establish the current maximum prices.

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Kraft—per cwt.—Carload Quantities Zone A, f.o.b. Mill			
Superstandard Wrapping	*$5.25	@	—
No. 1 Wrapping	*5.00	"	—
Standard Wrapping	*4.75	"	—
Standard Bag	*4.375	"	—
* OPA Manufacturers' Prices.			
Tissues—Per Ream—Carlots			
White No. 1	1.12½	"	—
White No. 1 M. G.	1.10	"	—
White No. 1½	1.00	"	—
White No. 2	.90	"	—
Anti-Tarnish M.F.	1.20	"	—
Colored	—	"	—
Kraft	.95	"	—
Manila	.90	"	—
Toilet—1 M. Sheets—Per Case			
Unbleached	4.25	"	—
Bleached	5.70	"	—
Unbl. Toilet, 1 M.	4.16	"	—
Bleached Toilet	5.70	"	—
Paper Towels, Per Case—			
Unbleached, Jr.	2.20	"	—
Bleached, Jr.	3.20	"	—
Manila—per cwt.—C. l. f. a.			
No. 1 Jute	11.25	@	—
No. 1 Manila Wrapping, 35 lb.	6.00	"	6.25
No. 2 Manila Wrapping, 35 lb.	5.75	"	6.00
Boards, per ton—			
News	*48.00	@	—
Chip	*48.00	"	—
Sgl. Mla. Ll. Chip	*60.00	"	—
White Pat. Coated	*75.00	"	—
Kraft Liners 50 lb.	*63.00	"	—
Binders Boards	84.00	"	116.00

* OPA Base Prices per 10 tons. Less than 10 tons but over 3 tons, add $2.50; three tons or less, add $5; regular 35-39 basis, add $5.; basis 40-49, add $2.50; basis 91-100, add $2.50; basis 101-120, add $5.

The following are representative of distributors' resale prices:

Rag Content Bonds and Ledgers—White, Assorted Items, Delivered in Zone 1:

	Bonds	Ledgers
100% Rag Ext. No. 1	$39.10@$46.00	$40.25@$47.25
100% Rag	32.20 " 37.75	33.35 " 39.25
85% Rag	.... "	29.90 " 35.00
75% Rag	23.00 " 27.00	24.15 " 28.25
65% Rag	.... "	22.80 " 27.75
50% Rag	18.70 " 22.75	19.90 " 24.25
25% Rag	16.40 " 20.00	17.55 " 21.50

Colors at $1.00 cwt. extra.

Sulphite Bonds and Ledgers—White, Assorted Items. Delivered in Zone 1:

	Bonds	Ledgers
No. 1	$10.55@$12.75	$11.70@$14.25
No. 2	9.65 " 11.75	10.80 " 13.25
No. 3	9.20 " 11.25	10.35 " 12.50
No. 4	8.90 " 10.75	10.05 " 12.25

Colors $1.00 cwt. extra.

Free Sheet Book Papers—White, Cased Paper. Delivered in Zone 1:

No. 1 Glossy Coated	$13.65@$13.9
No. 2 Glossy Coated	12.40 " 14.00
No. 3 Glossy Coated	11.60 " 13.25
No. 4 Glossy Coated	11.15 " 12.75
No. 1 Antique (watermarked)	10.25 " 11.75
No. 2 Offset	9.60 " 11.00
A Grade E. F.	9.35 " 10.75
A Grade S. & S. C.	9.60 " 11.00
B Grade E. F.	8.85 " 10.25
B Grade S. & S. C.	9.10 " 10.50
C Grade E. F.	8.55 " 9.75
C Grade S. & S. C.	8.80 " 10.00
D Grade E. F.	8.25 " 9.50
D Grade S. & S. C.	8.50 " 9.75

Ivory & India at $.50 cwt. extra.

Wood Pulp

OPA Maximum Prices and Canadian Manufacturers Prices, Less Freight, Not Exceeding OPA Allowances.

Bl. Softwood Sulphite	$86.00
Unbl. Softwood Sulphite	74.00
Bl. Hardwood Sulphite	83.50
Unbl. Hardwood Sulphite	71.50
Bl. Mitscherlich	81.00
Unbl. Mitscherlich	72.00 @ 82.00
N. Bleached Sulphate	86.00
S. Bleached Sulphate	79.00
N. Semi-Bleached Sulphate	82.00
S. Semi-Bleached Sulphate	76.00
N. Unbl. Sulphate	73.00
S. Unbl. Sulphate	63.50
Bl. Soda	72.00
Unbl. Soda	68.00
Groundwood	50.00

Transportation Allowances Applying to Producers of Wet Wood Pulp.

	Below 50% Air Dry Weight
Northeast	$13.50
Lake Central	13.50
Southern	16.00
West Coast (in area)	10.50
West Coast (out area)	16.50

	50%-80% Air Dry Weight
Northeast	$11.50
Lake Central	11.50
Southern	14.00
West Coast (in area)	9.50
West Coast (out area)	15.50

Applying to Producers of Dry Wood Pulp.

	Above 80% Air Dry Weight
Northeast	$8.50
Lake Central	8.50
Southern	11.00
West Coast (in area)	7.50
West Coast (out area)	13.50

Should freight charges actually exceed these allowances, the difference may be added to the maximum prices

Domestic Rags

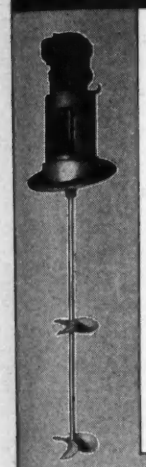
New Rags

(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—			
New White, No. 1	6.50	@	7.25*
Silesias No. 1	—	"	5.75*
New Unbleached	6.75	"	7.50*
Blue Overall	—	"	5.50*
Fancy	—	"	3.50*
Washables	—	"	3.00*
Bleached Khaki Cuttings	—	"	4.25*
Unbleached Khaki Cuttings	—	"	1.90*

* OPA Maximum Prices.

EASTERN PORTABLE MIXERS AVAILABLE NOW FOR PROMPT DELIVERY



Mixers of various speeds and motor enclosures are available now for prompt delivery in sizes of 1 H.P. or less.* Tell us about your mixing requirements and we will recommend the correct mixer taking quick delivery into consideration.

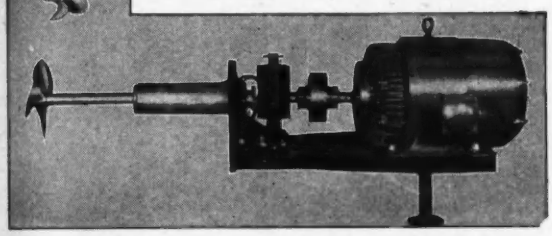
H Series operating at 1725 R.P.M. are widely used not only because of their low initial cost but also because mixers operating at this speed meet nearly every requirement for stirring thin and medium viscosity liquids.

S Series operating at 1125 R.P.M. are recommended for free flowing liquids which require large propeller surfaces operating at medium speeds. They are especially adaptable to mixing large volumes of moderately viscous materials.

G Series operating at 400 R.P.M. are all equipped with geared-head motors especially designed for heavy, low speed mixing. All motors have ball bearing mounted shafts and the slow speed countershafts are mounted on tapered roller bearings. These mixers are unequalled in their applications to all problems of heavy mixing and slow powerful fluid handling. They can be supplied for any operating speed from 8 to 800 R.P.M. and are especially adapted for mixing heavy, very viscous materials.

*Larger sizes available but not shipped from stock.

EASTERN ENGINEERING COMPANY
54 FOX STREET NEW HAVEN 6, CONN.



HERMANN CLAFLIN REFINER FOR

Maximum Strength Development with Minimum Cutting. Develops High Mullen with High Tear and at High Freeness.

Special Hydrating Filling Particularly Advantageous for Kraft Pulps and Furnishes Requiring Long Beating.

Replaces Beaters and Jordans.

Due to Results Achieved with No. 2 Size Plans are being made for a Larger Size.

With Exception of Maintenance Parts and Repairs Our Plant Facilities are being used for Defense Products.

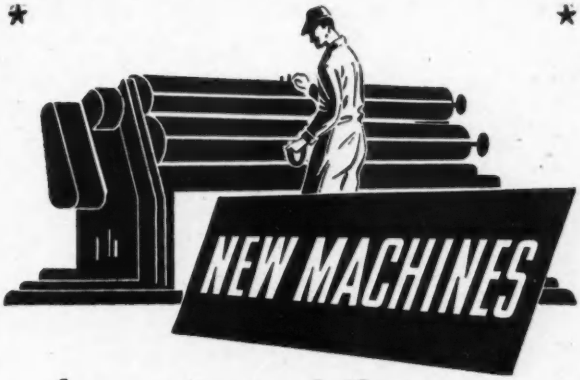
THE HERMANN MANUFACTURING CO.
LANCASTER, OHIO

More than just a TRADE MARK

EXCELSIOR Woolen Co. KNOX Camden, Me. FELTS & JACKETS

BUT also a guarantee by men who for 78 years have prided themselves in making finer felts. TO YOU —this is the mark of dependability, longer felt life and greater saving.

KNOX WOOLEN CO.
CAMDEN, MAINE.



for post-war delivery . . .

Just to remind you that we will again be prepared to give you new and improved equipment for your post-war paper converting problems.

Both your plant and our plant are now interested in one objective — beating the Axis.

After the war you will need, and we will build, equipment to meet your post-war needs.

It might be well to do a little thinking and planning about these requirements right now!

HUDSON-SHARP
MACHINE CO • GREEN BAY • WIS

Old Rags

White, No. 1—			
Repacked	*3.80	"	—
Miscellaneous	*3.20	"	—
White, No. 2—			
Repacked	*2.90	"	—
Miscellaneous	*2.65	"	—
Third and Blues—			
Repacked	*2.20	"	—
Miscellaneous	*1.80	"	—
Roofing Rags—			
No. 1	*1.55	"	—
No. 2	*1.45	"	—
No. 3 (bagging)	*1.35	"	—
No. 4	*1.35	"	—
No. 5A	*1.35	"	—
Old Manila Rope	5.75	"	—

OPA Maximum Prices.

Foreign Rags

All Prices nominal

New Rags			
New Dark Cuttings	2.25	●	2.40
New Mixed Cuttings	2.00	"	2.20
New Light Silesias	5.50	"	5.75
Light Flannelettes	5.50	"	5.75
New White Cuttings	7.00	"	7.50
New Light Oxfords	4.00	"	4.50
New Light Prints	3.00	"	3.25
Old Rags			
No. 1 White Linens	7.50	"	8.50
No. 2 White Linens	6.50	"	7.50
No. 3 White Linens	4.50	"	—
No. 4 White Linens	2.25	"	3.25
No. 1 White Cotton	4.25	"	4.75
No. 2 White Cotton	3.25	"	3.75
No. 3 White Cotton	2.50	"	3.00
No. 4 White Cotton	1.90	"	2.20
Extra Light Prints	2.00	"	2.40
Ord. Light Prints	1.75	"	2.15
Med. Light Prints	1.55	"	1.95
Dutch Blue Cottons	2.25	"	2.50
French Blue Linens	3.00	"	—
Checks and Blues	2.00	"	—
Linsey Garments	1.90	"	2.00
Dark Cottons	1.50	"	1.60
Old Shopperies	1.30	"	1.45
New Shopperies	1.45	"	1.50
French Blues	2.25	"	2.50

BAGGING

(Prices to Mill, f. o. b. N. Y.)

Gunny No. 1—			
Foreign	Nominal		
Domestic	4.25	●	4.35
Wool Tares, light	4.25	"	4.50
Wool Tares heavy	4.50	"	5.00
Bright Bagging	4.50	"	4.85
Manila Rope—			
Foreign	—	"	—
Domestic	*5.75	"	—
Jute Threads	5.50	"	—
No. 1 Sisal Strings	*4.00	"	—
Mixed Strings	2.00	"	—

* OPA Maximum Price.

Old Waste Papers

(F. o. b. New York)

OPA Maximum Prices

No. 1 Hard White Envelope Cuts, one cut	3.37½	●	—
No. 1 Hard White Envelope Cuts	3.12½	"	—
No. 1 Hard White Shavings, unruled	2.87½	"	—
No. 1 Hard White Shavings, ruled	2.50	"	—
Soft White Shavings, one cut	2.87½	"	—
No. 1 Soft White Shavings	2.50	"	—
Soft White Shavings, Misc.	2.15	"	—
No. 1 Fly Leaf Shavings	1.67½	"	—
No. 2 Fly Leaf Shavings	1.12½	"	—
No. 1 Groundwood Fly Leaf Shavings	1.25	"	—
No. 2 Mixed Groundwood Fly Leaf Shavings	.90	"	—
Mixed Colored Shavings	.75	"	—
Mixed Groundwood Colored Shavings	.90	"	—
Overissue Magazines	1.67½	"	—
No. 1 Heavy Books & Magazines	1.67½	"	—
Mixed Books	.85	"	—
No. 1 White Ledger	2.17½	"	—
No. 2 Mixed Ledger, colored	1.87½	"	—
New Manila Envelope Cuttings, one cut	2.87½	"	—
New Manila Envelope Cuttings	2.65	"	—
Extra Manilas	1.85	"	—
Mixed Kraft, Env. & Bag Cuttings	2.75	"	—
Kraft Envelope Cuttings	3.25	"	—
Triple Sorted, No. 1 Brown Soft Kraft	2.50	"	—
New 100% Kraft Corrugated Cuttings	2.25	"	—
No. 1 Assorted Old Kraft	1.75	"	—
New Jute Corrugated Cuttings	.90	"	—
Old 100% Kraft Corrugated Containers	1.75	"	—
Old Corrugated Containers	1.15	"	—
Box Board Cuttings	.72½	"	—
White Blank News	1.65	"	—
Overissue News	.85	"	—
No. 1 News	.75	"	—
No. 1 Mixed Paper	.70	"	—
Old Corrugated Containers	.82½	"	—
Mill Wrappers	.85	"	—

Twines

All Prices Nominal

(F. o. b. Mill)

(Soft Fiber)

Coarse Polished—			
India	.21	●	—
White Hemp	.21	"	—
Fine Polished—			
Fine India	.26	"	—
Unpolished—			
Box	.17½	"	—
Paper Makers	.17	"	—
Tube Rope	.19	"	—
Wall Paper	.20½	"	—
Wrapping	.23	"	—
Soft Fiber Rope	.19	"	—
Cotton	.25	"	—
(Hard Fiber)			
Medium Java	.18	"	—
Mex. Sisal	.16	"	—
Manila		"	—

PHILADELPHIA

Domestic Rags (New)

(Price to Mill.)

Shirt Cuttings—	
New White No. 1	.07½
New White No. 2	.05½
Light Silesias	.05½
Black Silesias, soft	.03¼
New Unbleached	.07½
Washable Prints	.04¼
Washable No. 1	.03
Blue Overall	.05½
Cottons—According to grades—	
Washable shredding	.01¾
Fancy Percales	.04¼
New Black Soft	.03¼
Khaki Cuttings—	
Unbleachable Cotton Cuttings	.03½
Bleachable Cotton Cuttings	.04½
Men's Corduroy	.03½
Ladies' Corduroy	.03
Cottonades	.03¼

Domestic Rags (Old)

White No. 1 — Repacked	3.80	"	—
Miscellaneous No. 1	3.20	"	—
Miscellaneous No. 2	2.65	"	—
White No. 2 — Repacked	2.90	"	—
Thirds and Blues—			
Miscellaneous	1.80	"	—
Repacked	2.20	"	—
Black Stockings—			
(Export)	Nominal		
Roofing Stock—			
Foreign No. 1	Nominal		
Domestic No. 1	1.55	"	—
Domestic No. 2	1.45	"	—
Roofing Bagging	1.35	"	—
Old Manila Rope	5.75	"	—

Bagging

(F. o. b. Phila.)

Gunny No. 1—			
Foreign	Nominal		
Domestic	3.00	"	3.50
No. 1 Clean bright—			
Sisal Strings			.04
No. 2 Clean bright—			
Sisal Strings			.03
Sisal Jute	.02½	"	.02¾
Scrap—			
No. 1	3.25	"	3.50
No. 2	1.75	"	1.80
Wool Tares	4.00	"	4.25
No. 1 New Light Burlap	3.00	"	4.00
New Burlap Cuttings	3.75	"	4.00

Old Papers

(F. o. b. Phila)

OPA Maximum Prices

No. 1 Hard White Envelope Cuts, one cut	3.37½	"	—
No. 1 Hard White Shavings, unruled	2.87½	"	—
Soft White Shavings, one cut	2.50	"	—
White Blank News	1.65	"	—
Soft White Shavings, Misc.	2.15	"	—
No. 1 Fly Leaf Shavings	1.67½	"	—
No. 2 Fly Leaf Shavings	1.12½	"	—
No. 1 Groundwood Fly Leaf Shavings	1.25	"	—
No. 2 Groundwood Fly Leaf Shavings	.90	"	—
Mixed Colored Shavings	.75	"	—
New Manila Envelope Cuts, one cut	2.87½	"	—
Hard White Envelope Cuts, one cut	3.37½	"	—
Triple Sorted No. 1 Brown Soft Kraft	2.50	"	—
Mixed Kraft Env. & Bag Cuttings	2.75	"	—
Kraft Envelope Cuttings	3.25	"	—
No. 1 Heavy Books & Magazines	1.67½	"	—
New Manila Envelope Cuts, one cut	2.87½	"	—
New Manila Envelope Cuttings	2.65	"	—
White Blank News	1.65	"	—
No. 1 Assorted Old Kraft	1.75	"	—
No. 1 Mixed Paper	.70	"	—
Overissue News	.85	"	—
Box Board Cuttings	.72½	"	—
New Corrugated Cuttings, Kraft	2.25	"	—
Old 100% Kraft Corrugated Containers	1.75	"	—
Old Corrugated Containers	1.15	"	—
Jute Corrugated Cuttings	1.07½	"	—

Bagging

(F. o. b. Boston)

Gunny Bagging—			
Foreign	(nominal)		
Domestic	3.25	@	—
Sisal Rope No. 1	*4.75	"	—
Sisal Rope No. 2	*4.25	"	—
Mixed Rope	2.00	"	—
Transmission Rope—			
Foreign	(nominal)		
Domestic	2.75	"	3.00
Manila Rope—			
Foreign	(nominal)		
Domestic	5.75	"	—
Soft Jute Rope	5.25	"	—
Jute Carpet Threads	3.00	"	3.50
Bleachery Burlap	8.50	"	9.00
Scrap Burlap—			
Foreign	(nominal)		
Domestic	3.50	"	—
Wool Tares—			
Foreign	(nominal)		

BOSTON

Old Papers

(F. o. b. Boston)

OPA Maximum Prices

No. 1 Hard White Shavings, unruled	2.87½	●	—
No. 1 Hard White Shavings, ruled	2.50	"	—
Soft White Shavings, Misc.	2.15	"	—
No. 1 Fly Leaf Shavings	1.67½	"	—
No. 2 Fly Leaf Shavings	1.12½	"	—
No. 1 Groundwood Fly Leaf Shavings	1.25	"	—
No. 2 Groundwood Fly Leaf Shavings	.90	"	—
Mixed Colored Shavings	.75	"	—
New Manila Envelope Cuts, one cut	2.87½	"	—
Hard White Envelope Cuts, one cut	3.37½	"	—
Triple Sorted No. 1 Brown Soft Kraft	2.50	"	—
Mixed Kraft Env. & Bag Cuttings	2.75	"	—
Kraft Envelope Cuttings	3.25	"	—
No. 1 Heavy Books & Magazines	1.67½	"	—
New Manila Envelope Cuts, one cut	2.87½	"	—
New Manila Envelope Cuttings	2.65	"	—
White Blank News	1.65	"	—
No. 1 Assorted Old Kraft	1.75	"	—
No. 1 Mixed Paper	.70	"	—
Overissue News	.85	"	—
Box Board Cuttings	.72½	"	—
New Corrugated Cuttings, Kraft	2.25	"	—
Old 100% Kraft Corrugated Containers	1.75	"	—
Old Corrugated Containers	1.15	"	—
Jute Corrugated Cuttings	1.07½	"	—
Misc.	2.15	"	—
No. 1 White Ledger	2.17½	"	—
No. 2 Ledger, colored	1.87½	"	—
No. 1 Heavy Books & Magazines	1.67½	"	—
Overissue Magazines	1.67½	"	—
New Manila Envelope Cuttings	2.65	"	—
No. 1 Assorted Old Kraft	1.75	"	—
No. 1 Mixed Paper	.70	"	—
Box Board Cuttings	.72½	"	—
Kraft Corrugated Cuttings	2.25	"	—
Old Corrugated Containers	1.15	"	—
Overissue News	.85	"	—
No. 1 News	1.00	"	—

Bagging

(F. o. b. Boston)

Domestic	4.25	"	—
Aust. Wool Pouches	3.75	"	4.00
New Burlap Cuttings	4.75	"	5.00
Heavy Baling Bagging	4.00	"	4.25
Paper Mill Bagging	2.50	"	3.00
No. 2 Roofing Bagging	1.35	"	—

* OPA Maximum Price.

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints	.04½	●	.04¾
Fancy Percales	.04¼	"	.05
New White No 1	.06¾	"	.07
New Light Flannelettes	.05½	"	.06
Canton Flannels, Bleached	.06	"	.06½
Underwear Cutters, Bleached	.06¼	"	.06¾
Underwear Cutters, Unbleached	.05¾	"	.06
Silesias No. 1	.06	"	.06½
New Black Silesias	.03	"	.03½
Red Cotton Cuttings	.03½	"	.04
Soft Unbleached	.06½	"	.06¾
Blue Cheviots	.05½	"	.06
Fancy	.02¾	"	—
Washable	.02¾	"	—
Khaki Cuttings	.02¾	"	.03
O. D. Khaki	.03½	"	.03¾
Corduroy	.03¾	"	.03½
New Canvas	.06¼	"	.06¾
B. V. D. Cuttings	.06¾	"	.06¾

Domestic Rags (Old)

(F. o. b. Boston)

White No. 1—			
Repacked	3.80	●	—
Miscellaneous	3.20	"	—
White No. 2—			
Miscellaneous	2.65	"	—
Twos and Blues, Repacked	2.20	"	—
Old Blue Overalls	2.25	"	2.50
Thirds and Blues, Repacked	2.20	"	—
Miscellaneous	1.80	"	—
Black Stockings	3.50	"	4.00
Roofing Stock—			
No. 1	1.55	"	—
No. 2	1.45	"	—
No. 3	1.35	"	—
No. 4	1.35	"	—
No. 5, Quality A	1.35	"	—
Quality B	1.20	"	—
Quality C	.95	"	—
* Old Manila Rope	5.75	"	—

* OPA Maximum Prices.

Foreign Rags

(F. o. b Boston)

Canvas	(nominal)
Dark Cottons	(nominal)
Dutch Blues	(nominal)
New Checks and Blues	(nominal)
Old Fustians	(nominal)
Old Linsey Garments	(nominal)
New Silesias	(nominal)

CHICAGO

Waste Paper

(F. o. b. Chicago)

OPA Maximum Prices.

Shavings—			
No. 1 Hard White Envelope Cuts, one cut	3.37½	"	—
No. 1 Hard White Shavings, unruled	2.87½	"	—
No. 1 Soft White Shavings	2.50	"	—
No. 1 White Ledger	2.17½	"	—
No. 1 Heavy Books & Magazines	1.67½	"	—
White Blank News	1.65	"	—
Mixed Kraft Env. & Bag Cuttings	2.75	"	—
No. 1 Assorted Old Kraft	1.75	"	—
Overissue News	.85	"	—
No. 1 News	.75	"	—
No. 1 Mixed Paper	.70	"	—
No. 1 Roofing Rags	1.55	"	—
No. 1 Roofing Bags	1.45	"	—